

April, 1939

CONSUMERS' RESEARCH BULLETIN

General Bulletin Number



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Consumers' Research BULLETIN

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This number is one of 4 *Bulletins* issued during the year by Consumers' Research which are not confidential. This *Bulletin* may be freely discussed with friends. We hope that you will use the opportunity to show them what CR is doing for consumers. *The *General Bulletin* is available not only to individuals, but to libraries, schools, and other groups, at \$1 for the subscription year October through June. The next non-confidential issue will be the June 1939, number. *Responsibility for all specific statements of fact or opinion at any time made by Consumers' Research lies wholly with the technical director and staff of the organization. *Please send notice of any change of address at least two weeks before it is to take effect, accompanying your notice with statement of your previous address. Duplicate copies cannot be sent to replace those undelivered through subscriber's failure to send advance notice, except at the regular price for orders of such material as back issues. N.B.—For a detailed account of CR's early history, policies, and information as to the answering of special inquiries about commodities, subscribers are urged to read the *Introduction to Consumers' Research*, which is sent to anyone without charge.

Symbols used to indicate sources of data and bases of ratings:

A—recommended on basis of quality.

AA—regarded as worthy of highest recommendation.

B—intermediate with respect to quality.

C—not recommended on basis of quality.

cr—information from Consumers' Research's own tests or investigations.

1, 2, 3—relative prices, 1 being low, 3 high.

38, 39—year in which test was made or information obtained by the staff of Consumers' Research.

Off the Editor's Chest

SEVERAL years too late to prevent the loss of some tens of billions of national wealth and of fundamental areas of individual liberty that Americans used to possess as a matter of course, literary and economic-writing folk are moving fast toward a rediscovery of the virtues of capitalism. They are alarmed at certain grave dangers of "New Dealism" in particular, and in general at the growing tendency toward encroachment by State powers and authority upon individual and corporate economic life [exemplified by various well-established attempts by New Deal officials to acquire means for controlling expressions of critical opinion in the press and on the radio; there have been more instances of suppression of free speech in print and on the radio under the New Deal, and more ingenious methods devised for accomplishing the overriding of intelligent opposition, than under any previous American government since the World War, yet there has been more talk of civil liberties than ever before in our history.] Fast-spreading realization of the oppressive powers of most European States over the lives and movements of millions who built those States up from mere New Deals of their era to relentless unstoppable machines for mass direction of their citizenry, has taught Americans an unforgettable lesson. That lesson is suspicion of the disparity between the Centralized State's promises of good will to all and its acts in concrete conflicts with protesting groups of its citizens demanding to be left alone or to retain rights once possessed in peace.

Consumers' Research, early in the days of the New Deal, announced its firm conviction that detailed control of industry from Washington was not only a drive against the welfare of consumers—that is, the tax-paying public at large—but constituted a trend toward an overpowering, dominating State indistinguishable in attitudes or aims from the collectivism of Germany or Russia. (Totalitarianism's measure is always found in the governmental attitude of "never give the consumer a break.")

From the NRA and AAA doctrine of scarce goods of every sort at higher prices, to the present-day Guffey Act market control plan for less coal at higher prices, the only consistent thread of philosophy in the aims and goals of totalitarian brain trusters at Washington has been "no quarter for consumers and taxpayers."

But even the fashionably pink literati, including writers on economic subjects, are beginning to detect something potentially hostile to their own reading and writing interests,

in coercive trends toward central-government management of the citizens' affairs.

The editors of *Fortune*, evidently aware of a sharp shift in public attitudes toward government, wrote:

"The New Deal's first big reform—the NRA—was a collectivistic measure. Indeed, though dead, it is a landmark in American government because here for the first time during peace an administration definitely proposed to control industry by means of a wholesale sacrifice of libertarian principles...most of Washington's economics have continued to be collectivistic in tone."

And the *Survey Graphic*, discussing articles by its writers on Germany, wrote:

"There has been a marked deterioration of quality of consumers' goods since the State stepped in to tell capitalists what to manufacture and how much.... Nothing remains of capitalism except the ardent desire...for its return....Ancient patterns of despotism are all repeated [in Russia, Germany, Italy]."

We're glad of the company of those who see, though late, the essential kinship between freedom of trade for business, and freedom of magazine writers and editors to make a living by buying and selling magazine articles and even advertising space, if they choose. We're glad to see a rediscovery of the vital fact that man's most dangerous enemy is a centralized government to which he has yielded up the power to say what goods shall be grown, or made, and sold, by whom, and at what prices. The purchase-votes of consumers, cast day by day in the marketplaces of every city and town and crossroads, are the only means by which these life-and-death decisions may fairly and safely be made. In what is left of free-market capitalism, you are still permitted to choose porterhouse steak or sausage, and to buy it from either the A & P or George Quackenbush & Sons; but when it is the government's services you buy, you are not allowed to choose. You pay for all the government's services even when you want only a few of them, and when March 15 and other tax dates come round, you pay on the line, OR ELSE.....If it is a government inspector who wishes, for any reason that suits him or his political boss, to look over the books or letters of your club or charity or church, you refuse this privilege at your peril. And don't forget the sizable portion of your income (25 percent or thereabouts) that goes to support the government and is thereby entirely removed from the realm of freedom of action, of choice, or of the market.

F. J. S.

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RADIOS—1939 MODELS

IN previous years it has been very disappointing to find at the completion of tests of the then current radios, that only one or, at best, two were sufficiently satisfactory to be recommended. Such a deficiency of sets that could be recommended was necessarily disappointing to our subscribers, since it allowed them little choice in the selection of a radio. It was therefore decided this year that efforts would be redoubled in an attempt to locate sets that were easily obtainable and at the same time good enough to merit at least a *B. Intermediate* rating. With this idea in mind, the market was rather thoroughly combed. A great many sets were given a preliminary examination, and from these the few which showed sufficient promise to warrant the time and expense of detailed test analyses were selected for a thorough going over. As would be expected with use of this method of selection, the list of *C. Not Recommended* sets is very short. It will be seen, however, by consideration of the new method of approach used, that this does not in the least imply that poor sets are few and far between, or that sets are improving relatively to previous years, for in point of fact, the number of inferior sets being marketed is as great as ever.

Unfortunately, even the considerable energy expended in attempting to locate good sets does not guarantee that none has been overlooked. There may be good sets not included in this test, but, in general, it can be said that most of the sets not included (if well known and not excessively expensive) were considered inferior or unsuitable, in some way important to the average consumer, for the present test.

Radio advertising and sales talks are just as overdrawn and imaginative this year as they have been in the past. Advertising men have taken the popular term "high fidelity" to their literary bosoms, and now one finds high-fidelity sets in everything from table models, where even fair fidelity is impossible, to the most expensive consoles, where it is reasonably possible but rather unlikely to be found. An interesting example of what can happen turned up while a late-model radio was being examined. A \$200 model was being demonstrated, and our consultant was assured by the salesman that the set reproduced music *exactly* as it was sent out by the broadcasting station. The set in question was further called "the finest musical instrument made." This was old stuff to our consultant, of course, so upon looking around the room and finding a \$750 model on display, he inquired if there was any difference between the tone of the \$200 model and that of the more expensive one. He was immediately assured that there was considerable difference in the reproduction of the two sets "but, of course, that one costs \$750." An amusing incident perhaps, exhibiting the troubles of the advertising man who has exhausted the possibilities of favorable description on a lower-

priced set and must then find expedients for selling a more expensive one. Indeed one only needs to read radio advertising and hear radio sales talks to be convinced, without the necessity of technical tests, of the utter unreliability and pointless exaggeration of the claims currently relied upon to move the stock from salesrooms.

Later on in the demonstration of a receiver of another make, the salesman was asked why he persisted in demonstrating a so-called "high-fidelity" receiver with the tone control in such a position as to cut off as much of the higher tones as possible. His explanation was that if this was not done the sale immediately "had two strikes against it." He further claimed that in spite of the resultant unbalance between the reproduction of bass and treble tones, the public liked it that way and "we give them plenty of it." The answer to that one is simple. Of course the public doesn't want to hear reproduction in the treble if that treble consists largely of distortion (and it is in the higher frequencies where distortion is most troublesome and most unpleasant to listen to). The consumer must remember in selecting a radio that if the set doesn't sound natural and pleasing and free from "edge" when the tone control is in the "treble" position, then it is very probable that it is giving badly distorted reproduction that will become distinctly unpleasant with continued use.

The sets in the present test (all console models) have been grouped (in some cases arbitrarily) into three general classes. First, the "Local-Station, High-Fidelity" receivers. These are intended for users who reside in the vicinity of broadcasting stations transmitting good quality programs which can be received without interference from other stations. These sets are made relatively unselective in order to favor the high-fidelity characteristic in giving good response to the higher audio-frequencies. Such sets are not equipped for short-wave reception. (As CR has several times noted, the absence of such short-wave equipment should be regarded as a lack merely of a talking point rather than of a fundamental quality, and should not be construed as a significant disadvantage to a person who really likes to hear music well and faithfully and pleasingly reproduced.) While the "local-station high-fidelity" receiver is the one giving the best reproduction under conditions for which it is suited, it must be recognized that it is not suited to all localities. For the person who is not content with a few—three or four—good nearby stations, but likes to listen to many, or who likes to fish for the distant or the "hard-to-get" stations, such a set is out, at least unless its suitability for one's needs can be tested on a trial basis for a week or two. Whether you are in a proper location for effective use of such a set may be taken up by letter with its maker, if a try-out is not practicable.

A second group of high-grade receivers may be

called "General Use High-Fidelity Radios." In this group belong the sets which are intended to reproduce programs as faithfully as possible, and at the same time be selective (rejective of interfering stations) enough to receive the majority of the stations in our now too-crowded broadcast band without excessive interference. These sets are usually equipped for short-wave reception, very often have variable selectivity controls,¹ and are almost always expensive. Most of the "De Luxe" receivers fall into this class. Furthermore, it must not be assumed that any such set will receive *all* desired stations without a degree of interference. So high a degree of selectivity is wholly incompatible in most locations with even reasonably good fidelity.

The third group of sets we may term "Standard Receivers." Usually found in the lower price brackets, these are not designed or manufactured for optimum fidelity (though they may often be called "high-fidelity" sets by salesmen or in advertising). They are usually equipped for short-wave reception. Such sets satisfy the ears of perhaps 85 percent of consumers, yet they are wholly unsatisfactory to persons who wish their music faithfully reproduced as it was broadcast. It is, however, in such sets that one receives the most distance-receiving capacity per dollar, or, as the average person looks at the problem, gets the most radio for his money, for such sets, being built for the mass market, are easily purchasable everywhere and at moderate prices.

This year, as previously, ratings are based primarily on the sets' fidelity—their ability to reproduce programs as broadcast, that is, with naturalness. In making tests for fidelity, measurements were made of the "over-all frequency response." The ability of the set to respond evenly to all tones was measured and plotted in curves, from the very low bass notes in the vicinity of 30 cycles, up to the high tones and overtones at and above 10,000 cycles. Several such curves were made in each case in order to show the effect of the bass and treble tone controls, the performance of the speaker, etc. The figures for tonal range given in the listings were obtained by electrical measurements which did not include the acoustic action of the loud-speaker in converting electrical impulses into sound, great simplification of technique being possible with this method. As a check on the action of the loud-speakers, additional audio (or sound) measurements including the speaker, were made in most cases. Measurements were also made to determine the *distortion* produced by the set (a factor apart from the frequency response but just as important to the critical ear). Each set was also given a careful listening test to check the results of the previous measurements, for it is now well understood that how a set sounds to an expert ear, buttressed by careful measurements, is the final test of its goodness; instrumental measurements do not yet *fully* supplant ear observations. Specifications have been

drawn up by CR as a tentative basis for rating high-fidelity receivers, and are given here for the benefit of technical readers. They are, in brief, as follows:

Qualifications Determining Rating of Radios Claiming High-Fidelity Characteristics

1. Electrical-fidelity characteristics (measured from antenna post to loudspeaker voice-coil) should be as flat as possible, with no region falling more than 10 decibels below a level line in the range of 40 to 7500 cycles.
2. Output voltage delivered to the voice-coil should be substantially linear in relation to the audio frequency component of the signal voltage supplied to the detector, with not over one or two decibels deviation within the range mentioned in paragraph 1.
3. The use of triode tubes throughout the audio amplifier is preferred, but where the higher plate-impedance tubes are used it is recommended that inverse feedback be employed.
4. A 10-watt electrical output to the speaker with a distortion not over 5 percent is considered desirable, but recognition is given to the fact that under certain use conditions, and for some users, a somewhat lower output may serve.
5. The loudspeaker voice circuit is to be of such design as to carry 10 watts of electrical input continuously.
6. The quality and characteristics of the loudspeaker, or the speaker-combination if two speakers and a coupling-network are employed, should be in accord with the best practices at present known to the art.
7. The receiver shall have sufficient selectivity for the locality in which it is designed to be used and a minimum band-pass of 15 to 16 Kc to pass $7\frac{1}{2}$ to 8 Kc. The band-pass characteristic shall be flat to within 10 decibels, plus or minus, but this band-pass may be reducible by a control to a minimum of 10 Kc. If a range greater than the stated 15 or 16 Kc is provided, for use under unusual reception conditions, this should be reducible by steps or continuously to 15 or 16 Kc (and thence to 10 Kc as above); and in addition a filter may be supplied in the audio circuit to give a high discrimination against 10 Kc beat-notes, if such is needed on account of lack of sufficiently high rejectivity in the tuned circuits.
8. The selectivity controls should be of such design as not to introduce distortion in the higher audio frequencies.
9. If the speaker is mounted in a cabinet, the cabinet is to be so designed that no mechanical or acoustical coupling is manifested between the cabinet and the moving elements of the speaker at any audio frequencies, and the cabinet design is to provide such massive and rugged construction and its proportions and damping be such that there will be no detectable "boominess" or cavity resonances in the reproduction of the lower audio frequencies.
10. The receiver design is to be such as to favor a minimum noise level.
11. The use of short-wave channels, automatic tuning, undue multiplicity of tubes, etc., is not favored; we recommend that savings achieved by these simplifications and reduction of design complexities which they permit, be used to the advantage of the consumer by a reduction in the selling price of the sets and by improv-

¹ A control which allows the operator to vary the ability of the set to reject unwanted signals. Thus he can eliminate or minimize interference in a region of the dial where the stations are crowded in (at the expense of fidelity). When no interference is present, he can take advantage, by turning a knob, of the full fidelity of which the set is capable.

ing performance, particularly audio performance, within the regular broadcast band.

12. The set should be so designed that the leakage current from any exposed part should not exceed the commonly recognized limit of 0.2 milliamperes.

* * *

It is recognized that in all likelihood no set presently offered commercially will meet all of the above specifications, but a given set may not be rated down on that account, provided that it adheres to the qualifications recommended above in the majority of important instances. The above recommendations are necessarily to be considered elastic and subject to revision from time to time in view of the constantly changing conditions in the radio and vacuum tube arts and industry.

It is fully realized that the above specifications could be set much higher and so afford much better broadcast reception. It is felt, however, that at the present stage of development, the costs of so doing would be regarded by most people as nearly prohibitive; a very modest stiffening of requirements in certain details could multiply the production cost of a set by two or three. Thus it will be seen that a set of absolutely first quality would cost not \$200 to \$300, but \$500 to \$1000—if the design in all respects followed practices which are the best now known to the art.

Anyone interested in purchasing a radio would do well to read over the advice given in CR's 1938 *Annual Cumulative Bulletin*, columns 319 to 321 inclusive. Though in very brief form, the hints given therein are basically important and should greatly simplify the choice and purchase of a radio; they serve as an essential supplement to the necessarily concise listings which follow.

Ratings are CR 39, except those marked with an asterisk. The latter have been carried over from CR's December 1938 *Bulletin* for the convenience of subscribers.

High-Fidelity Receivers for Local-Station Reception

A. Recommended

Philharmonic Linear Standard* (Philharmonic Radio Co., 54 W. 21 St., N.Y.C.) \$176 with dual (low and high frequency) speakers, but without cabinet. 14 tubes. Tuned radio-frequency, band-pass circuit. Maximum tonal range 30 to 14,000 cycles. Audio output ample. Tone quality rated as excellent; receiver ruggedly constructed; parts of good quality. Separate four-position high-audio-frequency (treble) control and bass amplifier. Audio amplifier equipped with the desirable inverse-feedback. Tuning indicator relatively ineffective due to broad-tuning characteristics necessary for high-fidelity reception—not considered an important disadvantage. The set's lack of equipment for short-wave reception not considered at all a disadvantage. May be purchased with record equipment (judged to be of good type) for about \$30 extra. Cabinets available in several styles or in special designs. Purchase of this set deemed advisable only for those in a position to receive nearby stations of good fidelity and good program quality, or for those who desire a broadcast receiver capable of high-quality phonograph record reproduction. **2

B. Intermediate

Dekalton Basic Unit (Dekalton Associates, Amherst, Ohio) \$80, speaker and chassis only, equipped with automatic volume control, station indicator (dial), and phonograph preamplifier. At \$112.50, set is mounted in chair-side cabinet but with unmounted speaker which may be mounted in *Dekalton Reproducer Screen* (\$21) or be built into a partition, door of large closet, or into a special baffle. CR has long advocated the mounting of radio speakers in the manner mentioned above (see for example CR's February 1938 *Bulletin*); no substitute method at present available, deemed quite satisfactory. Basic unit is 8-tube superheterodyne model (plus tube needed for phonograph preamplifier unit). Tonal range 40 to 8200 cycles, superior. Tone quality very good; indeed in that respect, set was one of the best so far tested, but output volume considered somewhat low for best reproduction and for that reason (and for reasons which follow) set for the present warrants B rating. Sensitivity somewhat low, but should suffice in many locations. Quality of parts, with exception of output transformer, satisfactory. Construction good, but basic unit may present some difficulties in mounting in certain cabinets. (This latter criticism does not apply, of course, to unit supplied in cabinet by maker.) It is evident that the maker of this radio, in attempting to supply a truly high-fidelity set at a reasonable cost has, in some respects, fallen short of standards which CR considers desirable. However, it does appear to represent the most in the way of high-fidelity radio now available at anything like its price, so far as information is available to CR. Unquestionably, it would be a logical selection where price is a determining factor. **1**

* * *

Magnavox Hepplewhite, Model 38, Radio-Phonograph Combination (The Magnavox Co., Inc., Fort Wayne, Ind.) Manually operated, \$145. 8 tubes, superheterodyne. Tonal range 50 to 7000 cycles, barely sufficient to put receiver in high-fidelity classification. Tone quality satisfactory, but a somewhat greater audio output than the 8 watts afforded would be desirable. This receiver used beam-power tubes without an inverse-feedback circuit, which, properly introduced into the audio stages, would have served to make tone quality definitely better. Set was somewhat deficient in sensitivity and selectivity. Had both bass and treble tone controls and was equipped, in addition to regular tuning dial, with 6-station push-button tuning of satisfactory type. Equipped for short-wave reception, not deemed important (or advisable) in a high-fidelity receiver lacking the sensitivity and selectivity necessary for a "General Use High-Fidelity" set. Set was equipped with built-in phonograph equipment which, operating on audio amplifier only, furnished good reproduction of phonograph records. (Automatic record-changer model available at \$198.50 equipped with superior-type automatic changing mechanism.) Cabinet of good design and satisfactory construction, though somewhat too light for best reproduction. Removal of chassis from cabinet difficult. **2**

Magnavox Berkeley (The Magnavox Co., Inc.) \$245 (with automatic record changer). This set uses the same radio chassis already reported above under the *Magnavox Hepplewhite*. Remarks appearing there as to performance, therefore, apply; the *Berkeley* unit,

B. Intermediate (contd.)

however, is supplied with a cabinet resembling a Chippendale chest which seems pleasing in appearance. Of good construction; will quite likely find favor with many consumers dissatisfied with current over ornate or freakish cabinet designs. This model is equipped with a superior type of record-changer. **3**

- **General Electric Radioforte* (General Electric Co., Bridgeport, Conn.) \$165. 9 tubes, superheterodyne. Tonal range 30 to 7800 cycles, good. Loud-speaker inferior, introducing needless amount of distortion at low frequencies. Cabinet design exceptionally good acoustically, with no objectionable resonance. Mechanical construction poor—had defective tuning mechanism, and improperly installed controls. This receiver used beam-power tubes without an inverse-feedback circuit in the audio stages which would have served to make tone quality definitely better. Equipped with 13-station push-button tuning mechanism; had no dial for tuning in the conventional way. In the set as received, tuning mechanism did not function properly. **2**

C. Not Recommended

- **RCA Victor Symphony, Model HF-1* (RCA Mfg. Co., Camden, N.J.) \$125. 8 tubes, superheterodyne. Tonal range 50 to 5000 cycles, not sufficient to be classed as high-fidelity. Tone quality possibly an improvement over "Standard" receivers in this price range, but not to be compared with sets given *A* or *B* rating above. Supplied with loud-speaker of too light construction. Cabinet small, not sufficiently massive, poorly finished. Equipped with 8-station push-button tuning mechanism, but had no dial for tuning in the conventional way. **1**

**High-Fidelity Receivers for General Use
in Regular Broadcast and Short-Wave Reception**

A. Recommended

Scott Phantom (E. H. Scott Radio Laboratories, Inc., 4450 Ravenswood Ave., Chicago) \$199. 19 tubes, superheterodyne. Tonal range 30 to 7900 cycles. Tone quality considered satisfactory. Sensitivity and selectivity good, so that this receiver should perform well on short waves. Had satisfactory variable selectivity arrangement. Parts and workmanship of superior grade. Cabinet ruggedly built. Phonograph equipment may be purchased with this set for about \$30 additional, but the cabinets supplied for the set when purchased as a combination radio-phonograph are considerably more expensive than the standard radio cabinet. A more economical method to provide a combination set (see CR's September 1938 *Annual Cumulative Bulletin*, cols. 322, 323) would be to purchase a separate record player and have a local radio serviceman wire it to this receiver with a suitable switching arrangement. Record reproduction with this set considered very good. Although *Scott* radios are for the most part purchased direct from the *Scott* factory, it is understood that this concern has a large number of authorized servicemen throughout the country, thus somewhat simplifying servicing difficulties when compared with some sets bought by mail order. It may be desirable specifically to investigate service problems in your own region, before purchase. **2**

- RCA, Model HF-8.* (RCA Mfg. Co., Camden, N.J.) \$250. 16 tubes, superheterodyne. Tonal range 50 to 7500

A. Recommended (contd.)

cycles. Speaker judged to be of good design with ample audio output. Set is equipped with desirable inverse feedback. Selectivity control and desirable bass boost tone control are provided. Equipped for short-wave reception and supplied with remote-control, push-button tuning. This set not rated on laboratory test by CR but on listening test and on technical data available to CR from a biased source but one believed reliable. **3**

RCA, Model U-134 (RCA Mfg. Co.) \$355. Radio-phonograph combination. 16 tubes. This model uses the same radio chassis as described under *Model HF-8* above. Record-playing equipment judged to be satisfactory. Last year this concern saw fit to offer an expensive radio-phonograph combination in which one of their lower-grade receiver-chassis was used. We are glad to report that this policy has now been reversed; the *Model U-134* combination is supplied at \$355 with the concern's best set. **3**

Scott Philharmonic (E. H. Scott Radio Laboratories, Inc.) \$349. 30 tubes (300 watts consumption), superheterodyne. Tonal range 30 to 16,000 cycles. 40 watts audio output. This set is very distinctly a "luxury-type" receiver for users to whom price is not an object. Although its performance, both in the broadcast band and on short waves will undoubtedly be very satisfactory to the majority of users, it is CR's opinion that the multiplicity of tubes and accessories is not needed. For most listeners an equally or more desirable purchase (considering servicing problem) would be one at a price \$100 to \$150 lower. The general remarks under *Scott Phantom* may be considered as applying to this set also. **3**

B. Intermediate

Scott Super XII (E. H. Scott Radio Laboratories, Inc.) \$110 (without cabinet; cabinets available at \$25 and up). 12 tubes, superheterodyne. Tonal range 40 to 7000 cycles, barely sufficient to put receiver in high-fidelity classification. Tone quality fair (the fault is due to the audio amplifier's being overcompensated). The essential differences, other than those already noted, between this model and the *Scott Phantom* are: set lacks the desirable inverse-feedback circuit, uses a lower grade of speaker, has simpler type of automatic volume control, and less (but ample) audio output. Other general remarks under *Scott Phantom* apply. This set at its price might be considered an economically desirable purchase for anyone not requiring the better fidelity to be found in the *A. Recommended* group. **1**

Standard Console Sets**B. Intermediate**

Knight, Model 145AE, Cat. No. E10799 (Sold by Allied Radio Corp., 833 W. Jackson Blvd., Chicago) \$77.50. 11 tubes, superheterodyne. Tonal range 40 to 4000 cycles. Tone quality pleasing, and satisfactory for this type of receiver considering the rather narrow tonal range; would have been improved, however, by the addition of an inverse-feedback circuit (involving only small extra cost) in connection with the beam-power output tubes. Speaker used was superior to those with which most of today's moderately-priced sets are equipped. Better, for example, than that of the *G.E. Radioforte* (\$165) listed elsewhere in this issue. Set was found

B. Intermediate (contd.)

to be very sensitive and selective and so should meet all usual requirements for general broadcast reception. It is believed it should give satisfactory operation on the short-wave bands which it was equipped to receive. Had push-button tone control and 9-station push-button tuning, in addition to conventional tuning dial. Push-buttons easily set to stations, but settings may also be easily changed by accident or by an uninformed person. Used 2 cathode-ray tuning-indicator tubes. Despite

B. Intermediate (contd.)

advertised claims for 11 tubes, was thus equivalent to the usual 10-tube set, so far as general performance on reception is concerned. Cabinet was constructed of somewhat light material which tended to cause a resonance in the lower bass. This set is definitely superior to others which we know of in its type and price class, and it is CR's opinion that it might constitute an economically good purchase for anyone not feeling any special need for high-fidelity reception.



RAZOR BLADES

ACCORDING to the Gillette Company the "lie detector 'tells all'"—meaning in this case presumably that it discloses just what a man thinks while he shaves. Considering the remarks which many men have been heard to make about certain blades and their effects upon the face, evidences of which could be seen at a considerable distance, one supposes that at least something of what they think might be shown on a chart perhaps, even though not suitable for printing for a select family audience. Then along comes the American Medical Association with the statement, in discussing so-called lie detectors: "There is actually no lie detector and the present status of this whole question is controversial." So we appear to be in the psychologic half-world of Gillette's advertising, not in the world of verifiable physical realities.

The use of the "lie detector" by Gillette for a test of razor blades makes advertising copy which is most impressive to those least informed on psychological emotional-reaction testing—to readers, in short, who tend to rely uncritically on what reads like SCIENCE in making up their minds as to a product's merits. Engineers or scientists would not be inclined to use such an indirect method of judging a simple phenomenon when other objective, rather than personal, methods of test are available. The Gillette-Marston blade-testing technique is analogous to attempts to determine the speed of a car, ignoring the speedometer, by using a "lie detector" to evaluate the emotional reactions of the car's occupants. A speedometer would give an accurate determination of the speed but would be much less impressive in an advertisement than a picture of a "scientific" test using an unfamiliar-looking instrument such as a lie detector; a lie-detector's determination wouldn't measure the speed of the car at all, but would merely indicate, perhaps, the observer's psychologic *reaction* to the speed, when what is of course wanted is the actual

miles per hour the car was traveling. But "lie detectors," because of their long association with movies and detective stories and near-scientific popular magazines, undoubtedly make impressive advertising copy. It is significant that with all the air of scientific background and care, there is no statement in the Gillette advertising we've seen that tells whether the *Gillette* and other blades used were representative samples purchased in the open market or whether they were samples specially honed and prepared by Gillette for this test. This seems, to CR, a very important omission. Even more interesting, perhaps, is the indisputable fact that sample *Gillette* blades, tested for sharpness on CR's machine, were found to be inferior in comparison with several other brands.

Results of this year's test on razor blades, just completed, are discouraging, to say the least—in fact there are even fewer bright spots than usual. CR's reliable sharpness-testing machine, by means of which several samples of each brand were examined, developed the fact that more blades than usual were unsatisfactory. All blades rated *A* had high initial sharpness but not all had high durability; when this quality was lacking, the fact was noted. The single-edge blades were particularly bad as to initial sharpness, none of them being deemed worthy of recommendation this year. Suppose a *Schick* razor will last for twenty years, as the guaranty printed in the company's advertising says, and it develops no faults during that time, how valuable is it if the blades that go with it are unsatisfactory? CR made shaving tests to determine whether or not blades indicated in the machine test to be sharp, actually gave satisfactory shaves; but such tests were only used for their confirmatory value with the more sensitive test method afforded by the sharpness- and durability-testing machine.

Looking over the results of CR's tests, and gazing at a few hacked faces one sees about, it is understandable why so many feel like risking \$10 or so on an electric razor, in spite of the heavy odds now plainly against these too. Neither is it surprising that a product like *Magic Shaving Powder* should appear, represented as a new, harmless method for removing hair which would leave a clear, smooth skin. The Federal Trade Commission took exception to the claims, however, and issued a complaint charging that the powder might be harmful to the skin and its underlying structures under ordinary conditions of use and might be very injurious to the eyes of the user. So when you get to the end of your razor-blade-endurance, don't turn to whisker-removing powders or potions.

Prices given per blade are either those noted on the packages or are retail prices paid by CR to dealers. All ratings are cr 39.

A. Recommended

Gillette-Type Blades

Dublekeen (General Blade Co., 7 W. 22 St., N.Y.C.) 3c. Also sold as *Elgin* and *Stetson*. Dependably high initial sharpness; durability somewhat variable but usually good. Some subscribers have complained of the A rating given to *Dublekeen* blades. Careful shaving tests, however, as well as machine tests, again indicate for the fifth year that these are, on the average, dependably sharp and lasting. It is suggested that any subscriber having trouble with these blades return them, perhaps with the razor in which they were used, to the General Blade Co. for examination. Occasionally it happens that the blades are at fault; sometimes the razor itself may cause the trouble.

Thin-Flex (General Blade Co.) 3 to 4c. One of the very thin blades. For second year found to have highest initial sharpness of all blades tested; durability excellent.

Wards Super Thin, Cat. No. 45—3522 (Distrib. Montgomery Ward & Co.) 4c plus postage. Initial sharpness not quite so high as *Thin-Flex*, but durability was exceptionally good.

Windsor Super-Thin (Windsor Mfg. Co., Inc., Orange,

A. Recommended (contd.)

N.J.) 5c. Initial sharpness not quite so high as *Thin-Flex*, but durability was exceptionally good.

* * *

The two following brands of razor blades were not of quite such good quality as those in the preceding group.

Gillette-Type Blades

Iros Keen (Iroskeen Blade Co., N.Y.C.) About 4c. Initial sharpness usually good but somewhat variable; durability fair.

Blades Other Than Gillette Type

Duro-Edge for *Durham Duplex* razors, Cat. No. 45—3292 (Distrib. Montgomery Ward & Co.) About 4c plus postage. Initial sharpness good. Durability fair.

C. Not Recommended

Gillette-Type Blades

Barbasol, 3c; *Blue Wing* (Distrib. Montgomery Ward & Co.), about 1c; *DoMore*, 1c; *Gillette Blue*, 5c; *Gillette Thin*, 2.5c; *Hardtem*, 10c; *Marlin*, 1.7c (exceptionally poor initial sharpness, indicating distinct change in quality from blades of this brand given a favorable rating last year); *Parker and Battersby*, about 4c (exceptionally low initial sharpness); *Red Cap*, 1c; *Ritz*, about 4c; *Segal*, 3c; *SR Double Edge* (Sears-Roebuck) about 1c; *Sta-Sharp Super Thin* (Sears-Roebuck) about 1.5c; *Stewart Ultra*, 5c; "*Tissue-Thin*" *De Luxe* (Marshall-Field), about 2c; *Twenty Grand*, 2c; *Wards Thin*, about 1.5c.

Blades Other Than Gillette Type

Christie, 5c; *Durham Duplex*, 10c; *Enders Speed*, 7c; *Ever-Ready*, 7c; *Gem Micromatic Double Edge*, 7c; *Gem Micromatic Single Edge*, 5c; *Marlin Single Edge*, about 2c; *Schick Magazine* and *Schick Injector*, about 3.5c; *Star*, 2.5c; *Swan Single Edge* (Sears-Roebuck), about 2c; *Treet*, 2.5c; *Valet Auto-Strop*, 5c; *Weck Sextoblade*, 10c.

Corrections and Emendations to:

~~Consumers' Research Bulletin~~ *Bulletin* issue of February 1939

Page 7 Automobiles: *Chrysler Imperial C23*. The statement that the tires of this car were not overloaded was based on announced tire size of 7.00 x 16. These cars are sold equipped with 6.50 x 16 tires and hence are considerably overloaded.

Pages 8 and 13 *Nash Ambassador 8*: This car was erroneously stated to lack full-length water jacket.

Page 22 Automobile Oils: *Amoco* (E) 10W *Sinclair Opaline* (E) 10W, and *Phillips Trop-Arctic* (S) 10W. Change ratings of these oils from B. *Intermediate* to A. *Recommended*; they were not misbranded as noted (due to an error of computation). • *Sunoco* (E) 10W. Delete the word misbranded. Rating remains unchanged.

NOTES ON ALCOHOL FOR CONSUMERS

THE purchase—and sale—of alcohol is hemmed in by many restrictions and tied up with much red tape. Although there are a large number of types of specially denatured alcohols available to manufacturers, only pure grain alcohol and completely denatured alcohol can be purchased as such by the ultimate-consumer public. Regulations of the sale of pure grain alcohol vary in the different states, except that it is available to hospitals and educational institutions everywhere on a tax-free basis. The cost of production of pure grain alcohol is 16 to 18 cents a gallon for 190 proof (95 percent alcohol by volume). Hospitals and educational institutions pay from 30 to 35 cents a gallon for this or about twice the cost of production. Where it is available to the public it must be tax-paid, and the present tax is of the very high order of \$4.27½ a gallon which is about twelve times the wholesale value of the product. In some states, there is a state as well as a federal tax to be paid. Some states, such as New York, permit the sale of tax-paid pure grain alcohol in 4-ounce portions at drugstores, but only on a doctor's prescription. Other states, such as New Jersey, permit the sale of this alcohol by the retail liquor stores.

The purpose of denaturing alcohol is to permit its sale for uses where the alcohol is not to be employed in medicine or beverages. The denaturants render it wholly unfit for human consumption. The intention nowadays is not so much to add toxic materials, but to make it so unpalatable that a person would not be able to drink it any more than he would be able to drink banana oil or other equally obnoxious liquid. Also if anyone attempted to drink completely denatured alcohol, it would undoubtedly have such unpleasant physiological effects, even though the person would not die from them, that there would be little danger of the attempt being repeated. Practically, the denaturants added have been such as to render the alcohol somewhat poisonous; one might put it that completely denatured alcohol has shown a trend over a period of years to become more and more obnoxious in odor and taste, and less poisonous.

Aside from the very strong and unpleasant-smelling types of "completely denatured" alcohol sold for antifreeze purposes, there are types which are relatively unobjectionable. These completely denatured alcohols are sold under various trade names as proprietary solvents, such as *Shellacol* sold by the Commercial Solvents Corp., *Ponsolve* sold by E. I. du Pont de Nemours & Co., *Synosol* by Carbide and Carbon, *Quakersol* by the Pennsylvania Alcohol Co., etc. These are all based on modifications of a standard formula known as SD-1, modifications which make them substantially "completely denatured." In modification, 100 parts of 190-proof or 95 percent alcohol have added to them 5 parts of ethyl acetate denatured with 1 part of aviation gasoline and a very small amount of wood alcohol. The product is characterized by the odor

of ethyl acetate (an odor familiar to many in nail polish remover).

Such an alcohol as described can be purchased in gallon containers at paint and hardware stores. It is in common use as a solvent for thinning shellac, as a cleaner for windows, and as a fuel alcohol for burning in chafing dishes, toy engines, spirit lamps, etc., and as a torch or soldering fuel. While completely denatured alcohol may be sold as such, dealers prefer to handle the proprietary products mentioned above because of their less disagreeable odor. Therefore if the purchaser asks for denatured alcohol he is apt to be sold a trade-brand product of this type. Fumes from these are not seriously toxic, nor is there very injurious effect if the alcohol should be spilled on the skin. The use of the deadly poisonous wood alcohol, which was at one time the favorite denaturant, is now fortunately not so common as heretofore. It now appears in the U. S. Treasury Department's Special Denatured Formulas 1 and 3A (5 parts per 100) and in Formula 30 (10 parts per 100), but these are not sold to the public directly.

Today completely denatured alcohols are sold largely as an automobile radiator antifreeze. These alcohols are denatured according to formulas designated as CD. They are required to be at least 160-proof, equivalent to 80 percent by volume. The commonly sold antifreeze alcohols correspond to Formulas CD-12, CD-13, or CD-14 and are 95 percent by volume or 190-proof. The formula for CD-12 will serve for purposes of illustration. To 100 parts of alcohol are added 4 parts of *Denol*, 2 of methyl isobutyl ketone, 1 of gasoline, and 1 part of *Agdile* or similar compound, or 2 parts of *Hydranol* or similar compound. The proprietary denaturants are of complex composition and conform to government specifications. Proprietary antifreeze alcohols are of this general nature and usually also contain oils added as rust inhibitors, antifoaming agents, etc. These alcohols are not suitable for solvent or fuel purposes because of their objectionable odor and a residue they leave on evaporation or burning. Antifreeze alcohols are sold at gasoline stations, motor-accessory stores, and in some department stores, usually under a brand name in one-gallon tins, or perhaps in bulk from a drum.

Recently antifreeze liquids have been sold consisting of methanol (wood alcohol). These have to be packaged with a poison label, which is not true for the SD and CD alcohols mentioned. (The latter do not contain poisonous ingredients in sufficient quantity to require a poison label.) Methanol is more expensive as an antifreeze than completely denatured ethyl alcohol but lacks its notably obnoxious and repellent odor. It is more efficient in that a smaller amount will have the same effect in lowering the freezing point of water. Several manufacturers market methanol for antifreeze use. In CR's opinion, it is definitely unsafe in automobile radiator service (see CR's October 1936 *Bulletin*).

Correct Concentration Important When Alcohol is Used as Antiseptic

Alcohol is sold by drugstores, not only as the tax-paid pure grain alcohol on prescription, but also as what is called rubbing alcohol compound. Rubbing alcohol is usually sold as 70 percent or 140-proof and in this concentration has only slight use as an antiseptic; 80.5 percent alcohol (equivalent to 70 percent by weight when the volumetric measurements are made at 25°C) is much more effective for antiseptics. (*New Studies in Surgical Bacteriology and Surgical Technique*, by Philip B. Price, M.D., Journal A.M.A., Nov. 26, '38.) Rubbing alcohol compound is ordinarily sold according to Formula 23-G, in which the alcohol is denatured with methyl propyl ketone, methyl isobutyl ketone, and sucrose octa-acetate, but this mixture has recently been reported to have both an unpleasant odor and rash-producing qualities; or according to Formula 23-H, in which the alcohol is denatured with methyl isobutyl ketone, acetone, and sucrose octa-acetate. The sucrose octa-acetate imparts an intensely bitter flavor so that there is little danger of use of this material internally. One cannot buy large volumes of this alcohol because chemists are able by round-about, difficult, and expensive methods, to recover potable alcohol from it.

A properly constituted rubbing alcohol could be a basis for making shaving lotions, hair tonics, etc., in the home,¹ for many shaving lotions consist mainly of water and alcohol, with a little perfume and sometimes coloring matter added. Seventy percent alcohol and even 50 percent alcohol will have a mildly astringent action, while 80.5% alcohol would be a particularly good antiseptic on cuts, small eruptions, etc. Bay rum, so popular with many men as an after-shaving lotion, usually contains 50 percent of alcohol along with some spicy oils, largely bay, orange peel, and clove or cinnamon.

The Alcohol-Consumer in Relation to The Government

Regulations governing the sale of alcohol all have the same origin: they are designed to protect the government's tax revenue from encroachments of bootleggers. Unfortunately, these regulations have given little consideration to the needs of the manufacturing or intermediate consumer, and practically none to the position of the ultimate consumer as a user of pure alcohol or denatured alcohol. One cannot therefore be assured that any given denatured alcohol will be wholly safe, particularly with respect to its effect on the skin, nor can one be assured that a given formula of denatured alcohol, found satisfactory, will be continuously or permanently available. The government is con-

stantly making changes in denatured alcohol formulas and has made serious mistakes. It seems fair to say that it has never approached its problem with full consideration of the elements of danger to the ultimate-consumer-user of alcohol who just wanted a safe product for his household needs, but had no interest either in imbibing the product or in processing it to produce grain alcohol for sale or for beverage or other purposes.

It would be very much in the consumer's and the general public's interest if (1) tax-free pure grain alcohol could be made available to individuals, corporations, educational institutions, pharmacists, physicians, dentists, chemists, hospitals, and to home compounders and researchers for proper use with an absolute minimum of red tape, and (2) if every change of denaturing formulas were carried out with an eye single to the welfare of the consumer and only secondary attention to the government's wish for certainty in outwitting the tax evader. Almost every sick person pays a heavy toll in the enormous excess of price charged for pure grain alcohol as a result of the Treasury Department's determination to outwit the bootlegger at whatever cost to consumers, small business, and the sick. Sick people have been disadvantaged in a second way, which is perhaps more important. In the attempts to avoid the use of the expensive grain alcohol, many manufacturers have employed other materials, quite toxic or uncertain, and for a long time the use of one of these materials—diethylene glycol—as a substitute for alcohol in flavoring extracts and some other food products was tolerated by the Food and Drug Administration (until many deaths were caused by its use in a medicine—see article "Elixir Poisonings" in CR's January 1938 *Bulletin*). Other substances used to avoid the expensive pure grain alcohol have been isopropyl alcohol and, in a surprising number of cases in past years, the extremely poisonous methanol, or wood alcohol.

It is believed there is no other or parallel situation where the government's need to get its revenue easily and with a minimum of trouble has been permitted to apply such an unwarranted tax upon the unoffending and well-intentioned Mr. Average Consumer. The Treasury Department's taking such an intense interest in the tax aspects and so weak a one in the use aspects of alcohol has cost consumers very large sums not only in their own purchases of alcohol, but in their purchase of alcohol indirectly in hair tonics, mouthwashes, flavoring extracts, and a score of medicinal and other commonly used products in every household. There has been a continued and well-justified agitation on the part of alcohol-using industries in recent years for mitigating the excessively severe restrictions in the use of alcohol. It is to be hoped that the Treasury officials may turn a sympathetic ear to these requests to extricate industry and consumers generally from a maze of complex regulations originally devised only to provide reasonable safeguards to tax revenues.

¹ Provided that its odor is not obnoxious, and that it does not cause a rash in the particular individual. There has been much complaint, evidently given little consideration by Treasury officials, that 23-G and alcohol formulas similar to it, said to be the only permitted rubbing alcohols, caused rash in many hospital patients and had an odor intolerable to patients and doctors.

PLATED SILVERWARE

IF one is buying plated silverware, should one buy that which is trade-marked 1847 Rogers Bros., 1881 Rogers, Wm. A. Rogers, Ltd., Wm. Rogers & Son, or Simeon L. and George H. Rogers? Should one choose the products of International Silver Company or those of National Silver Company? (Judging from unfavorable reports issued by the Federal Trade Commission one might be justified in not rating some products of the latter company along with those of some of the better-known firms.)

If by any chance the consumer has not been confused by the striking similarity of certain names in the silverware industry, there is still a high degree of probability that at least he will be fooled by the system of seven grades which the industry uses. They are called A1 or Standard; A1+, A1X or Extra; AA; Double or XX; Triple or XXX; Quadruple or XXXX; and F.S.B. (Federal Specifications Board). In this topsy-turvy system, which would seem to have been designed to confuse as much as possible the inexpert consumer, A1 is the lowest grade, in spite of the fact that A1 in ordinary discourse is used to designate something which is very good indeed, or "tops," as the slang phrase has it.

To plate one gross of teaspoons of A1 grade, two troy ounces of silver, worth about ninety cents, are required; tablespoons and dinner forks require twice as much per gross. The quadruple grade carries four times as much silver; the F.S.B. (best) grade carries four and one-half times as much on teaspoons and five times as much on tablespoons and forks as the A1 grade.

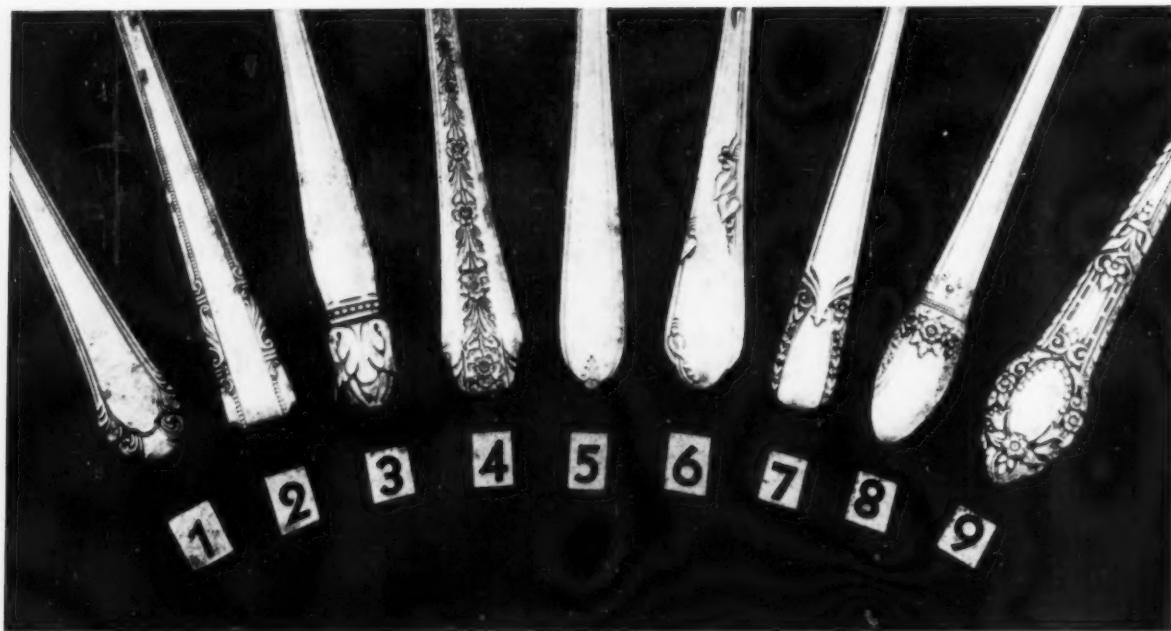
The consumer should not assume that the bullion value of the silver involved is an important factor in determining the price of plated silverware. On a plated teaspoon of the best grade only 3 cents' worth of silver is used; this comes to about 1/25 of what the consumer is likely to pay for the spoon. Considering that the presence of spoons in the ten-cent store shows how cheaply the blanks can be made (without respect to quantity of silver), it is at once apparent that table silverware as sold to ultimate consumers falls almost in the class of patent medicines in respect to the markup which can be charged. This comes about because, psychologically, silver is associated in the consumer's mind with value, since silver is a "precious metal" and the consumer has not stopped to think nor has he been told by his teachers in school, how very cheap is an infinitesimally thin coating of a precious metal. (Gold and silver, though valuable per ounce, can give very cheap plated coatings because both metals can be applied very thinly to a base-metal surface. It is the cost per square foot or square inch protected or ornamented that counts, not the intrinsic or bullion value of the precious metal used.) In these tests it happened that the A- and B-rated products fell entirely in the higher-priced brands. All of the cheapest brands, selling

for something below half the usual price, were rated C. *Not Recommended* on the basis of amount of silver plating and reinforcement. On the other hand, considering weight of silver provided per dollar, which may be a factor that would determine purchase for many users, assuming that the patterns on the cheaper ware are equally satisfactory, the two brands—Wm. Rogers & Son and 1881 Rogers—selling at \$3.50 per dozen teaspoons, were on a parity with, in the first case, and not far below in the second, the high-priced products selling at \$7 to \$8.50 per dozen.

If you buy 1881 Rogers you get, according to an advertisement, "the glamour and style-influence of Hollywood and Hollywood's leading stars"—the glamour of Gladys Swarthout, Rochelle Hudson, Olivia de Havilland, and others; but there is at least a reason to suspect that some of this glamour was acquired at the expense of the wearing qualities, for according to CR's tests you get only about one cent's worth of silver on each of these specially glamorous teaspoons. If you buy 1847 Rogers it is also possible to obtain Hollywood glamour; and this glamour, according to the advertisement, is that of Rosalind Russell. The manufacturer of 1847 Rogers claimed that this is "America's Finest Silverplate," but in CR's test, two other brands were found to carry more silver and five brands had heavier reinforcement, at the point of contact of the bowl with the table. Gorham claimed to give you "The Next Thing to Sterling," and Reed & Barton claimed "Nearest to Sterling in Quality"; CR found the Gorham spoon to be of good grade, whereas one of two samples of the Reed & Barton spoon was found to be the farthest removed in quality from sterling of nine spoons tested. As usual, it turns out that the more one learns from the advertising, the less reliable one's information is.

As CR has several times pointed out, advertising claims for plated ware such as "Will Last a Lifetime" and "Ageless" are misleading, for the typical plated silverware sold to ultimate consumers will wear through to the base metal long before a normal "lifetime" has elapsed. Such extravagant claims are still being made, but there is noticeable on the part of a few manufacturers a tendency toward less exaggeration—possibly as a result of CR's previous remarks on the subject. A recent advertisement stated, for example, "Community wears 'forever'...you alone to say how long 'forever' shall be." If taken literally, disillusioning, isn't it, for an advertisement! Possibly the switch to Hollywood and to glamour and to a meaningless comparison with sterling, represents a tendency to evade a line of advertising about very long life which CR's criticisms led the public to distrust.

When the plating is worn through, silverware may be replated at a plating establishment (at a charge which should not run higher than about \$20 for a 64-piece set) and will be in every way as good as new. Silverware manufacturers, however,



1-Gorham, Cavalier
2-Wallace, Personality
3-Holmes & Edwards, Danish Princess

4-Reed & Barton, Evangeline
5-Heirloom Plate, Longchamps
6-1881 Rogers, Meadowbrook

7-Wm. Rogers & Son, Talisman
8-1847 Rogers Bros., First Love
9-Community Plate, Rendezvous

will be likely to charge much more. Plated tableware in a good grade will cost almost as much as the cheapest grades of sterling silver; hence, there is some doubt as to which of the two would be the more economical purchase. Plated tableware could be replated once every ten years, and its life by this means extended to compare favorably with sterling. From the standpoint of the average consumer, however, plated silverware may be the more satisfactory investment. We understand from one trade source that secondhand plated silverware can be more readily sold than can secondhand sterlingware. As manufacturers of sterling advertise, sterling can always be sold for bullion, but the manufacturers fail to state, with the reticence as to telling the whole truth that is all too characteristic of advertising agencies, that as bullion it will bring only one-quarter of what it cost as silverware, and a markup above bullion of 300 percent, as anyone will agree, is a lot to charge for the inexpensive operations of stamping, designing, polishing and for the needlessly expensive ones of advertising and selling.

Cleaning of Silverware

Silverware may be easily cleaned with a fine grade of whiting (such as extra gilders) or precipitated chalk (obtainable at the drugstore for 25 or 30 cents a pound) moistened with household ammonia (about one part to nine or ten parts of water). Electrolytic cleaning is suitable for silverware other than that which has a French gray or oxidized finish, common in ornate patterns, or such objects as silver candlesticks or pearl-handled table knives which are made of parts that are either held together or weighted by cement. Place the silverware in a bright aluminum pan, or in an

enamelware pan in contact with a bright piece of aluminum such as a pie plate (if one prefers, bright zinc and tin in contact may be used instead of the aluminum); cover the silverware with hot salt-water mixed in the proportion of two teaspoonfuls of salt to one quart of water. The water should be kept hot but not quite boiling. After the silverware is clean it should be washed and polished with a soft cloth or with a little of the whiting cleaner already described. (A fuller discussion of electrolytic cleaning, and paste and liquid silver polishes, will be found in CR's May 1938 *Bulletin*.)

* * *

For the most part, only one sample of each brand was tested for weight of silver deposit, but in one case, when a check test was made, there was a notable difference, indicating, perhaps, an unduly large variation in some detail in the manufacturing process. In the case of an article as high priced in relation to its cost of production as silver-plated ware, the consumer has a right to take the ground that the manufacturer's quality may be fairly judged by a single sample, and that the maker is under obligation to take whatever measures are needed to produce a relatively uniform product. (In spoons of the ten-cent-store grade, fairly large variations were found, yet even those showed only from one-sixth to one-third as much discrepancy between samples as occurred in one instance given in this report.) Aside from design, which CR made no attempt to appraise, value of plated silverware depends upon workmanship, weight and composition of blank, average thickness of the silver plating, and reinforcement at places where the wear is most severe. Nine brands of plated silverware teaspoons were tested for average thickness of

plating and for thickness of reinforcement at the wear points where the spoon rests on the table.

Judging the silverwear by amount of silver coating provided per dollar (taking into consideration, also, the amount of reinforcement), it is judged that the *A* and *B* brands hereafter listed would fall approximately in the following order: *Holmes & Edwards Inlaid*; *Wallace Sterling Silver Shod*; *Gorham Silverplate*; *Heirloom Plate*; *1847 Rogers Bros.*; *Community Plate*.

All ratings are cr 39.

A. Recommended

Gorham Silverplate, Cavalier Pattern (The Gorham Co., Providence, R. I.) \$8 per doz teaspoons. One of those ranked third in weight of silver plating. Thickest reinforcement of 9 brands tested. Advertising claim that "Gorham Silverplate will give you a full lifetime of service and satisfaction," if read in the sense in which the consumer would understand the statement, is misleading (see discussion of silverware advertising in text). 3

Heirloom Plate, Longchamps Pattern (Oneida Ltd., Sherrill, N.Y.) \$7 per doz teaspoons. One of those ranked third in weight of silver plating of 9 brands tested. Satisfactory reinforcement. 3

Holmes & Edwards Inlaid, Danish Princess Pattern (Holmes & Edwards Divn., International Silver Co., Meriden, Conn.) \$8.50 per doz teaspoons. Carried the most silver of the 9 brands tested. Reinforcement on back of bowl satisfactory; the only brand tested satisfactorily reinforced at wear point of handle. Sterling inlay on back of spoon was, however, too near handle, its thickest section not being at point where spoon rests on table. 3

Wallace Sterling Silver Shod, Personality Pattern (R. Wallace & Sons Mfg. Co., Wallingford, Conn.) \$8 per doz teaspoons. Ranked second of 9 brands tested in weight of silver plating, and second in thickness of reinforcement. Advertising claim of "Ageless" and "Life-long Service" misleading (see text). 3

B. Intermediate

Community Plate, Rendezvous Pattern (Oneida Community, Ltd., Oneida, N.Y.) \$7 per doz teaspoons. Ranked fair in weight of silver plating. Reinforcement

B. Intermediate (contd.)

less than on any spoon rated *A*. 3

1847 Rogers Bros., First Love Pattern (1847 Rogers Bros., International Silver Co.) \$8 per doz teaspoons. One of those ranked third in weight of silver plating. Reinforcement somewhat scant, being sixth in thickness of the 9 brands tested. Advertising claim "America's Finest Silverplate" not borne out by CR's test. Not inferior to *Heirloom Plate* and *Gorham Silverplate* except in thickness of reinforcement. 3

C. Not Recommended

The first two brands listed hereafter, although inferior to spoons rated *A* and *B*, would be desirable and economical purchases if taken to a plater, before they are used at all, and given a "triple plate." In this way, a good grade of silverplate would be finally obtained at a lower price than is charged by a merchant for an equally good grade new. The consumer should shop around among platers for prices (which, for a new set, ought to be about \$6 to \$8 for 64 pieces) and should check up on the weight of silver plated by carefully weighing the silverware before and after sending it to the plater. To subscribers who ask for this information, CR will be glad to give addresses, in so far as these are available, of platers believed to be reliable. (Send stamped ready-addressed envelope.)

1881 Rogers, Meadowbrook Pattern (Wm. A. Rogers, Ltd., Oneida Ltd., Successor) \$3.50 per doz teaspoons. Ranked lowest in weight of silver plating. Very little reinforcement. 1

Wm. Rogers & Son, Talisman Pattern (International Silver Co.) \$3.50 per doz teaspoons. Ranked low in weight of silver plating. Reinforcement, so scant as to be of little value, though advertising claimed "Reinforced Silverplate." 1

Reed & Barton, Evangeline Pattern (Reed & Barton, Taunton, Mass.) \$8 per doz teaspoons. Very exceptionally wide variation in weight of silver on two samples. Average of the two samples ranked only fair in weight of silver plating. Reinforcement so scant as to be of little value. Manufacturer's claim "Nearest to STERLING in Quality" not justified. 3

Miscellaneous New Listings

Home Workshop Tools

CIRCULAR SAW, BELT DRIVEN, TILTING ARBOR TYPE

A. Recommended

Delta No. 1450 (Delta Mfg. Co., 600-634 E. Vienna Ave., Milwaukee) \$148 including stand, saw guard, kick-back fingers, extension tables, and 1-horsepower a-c motor. 10-inch diameter saw blade. Table size 20 x 27 in.; with side extensions 27 x 36 in. Maximum depth of cut, 3 3/8 in. cr 39

Electric Coffee Grinders

B. Intermediate

Kitchen Aid, Model A-9 (The Hobart Mfg. Co., Troy, Ohio) \$9.75. ac-dc. Coffee beans are placed in a glass jar which is then inverted, a somewhat unhandy arrangement. Recent advertising of this model, however, illustrates a different type of glass jar which has an opening at the top, with a cover, and hence does not require inverting. Replacement of brushes unduly difficult, requiring disassembly of motor unit. Fineness of grind judged satisfactory. cr 39 2

B. Intermediate (contd.)

Kitchen Aid, Model A-10 (The Hobart Mfg. Co.) \$14.75. ac—dc. In this model, the coffee beans are placed in transparent, celluloid-like receptacle by removing a metal cover. Replacement of brushes easily made from the outside of case. Fineness of grind judged satisfactory. cr 39 **3**

Photographic Equipment**ENLARGER****A. Recommended**

Ideal (American agents, Chess-United Co., Madison Ave. & 29 St., N.Y.C.) \$44.50 with f:4.5 *Benar* 5.5 cm anastigmat lens. Made in Czechoslovakia. Used 60- or 75-watt opal lamp. Single condenser. Designed for use with 35-mm negatives, but will handle negatives up to 4 x 4 cm. Provided with one holder for 35-mm film, clamping film at the edges. Focusing by means of a knurled nut operating on threaded rod. Head is moved by means of a smooth-working friction drive. Linear magnification on baseboard about 9 times. Definition excellent; alignment, rigidity, and ventilation satisfactory. Evenness of illumination good. Considered an excellent enlarger for those who would not find the limited range of enlargement on baseboard a disadvantage. **1**

TIMING SWITCH (for use in enlarging)**C. Not Recommended**

Little Marvel or *Faultless* (Central Camera Co., Chicago) \$6.95. This device is marketed under the names given, yet was actually stamped only with the brand name *Mark Time*. Claimed to be capable of being set by seconds for exposures of from 1 to 60 seconds. At 1 and 2 seconds rated speeds, errors were estimated to run to at least 15%. At higher settings above 15 seconds, the errors were around 10%. Exposure was not accurately repeated at any given setting. The quality of mechanism did not suggest great durability. An electric clock with large sweep-seconds hand with a hand-operated switch would give more accurate timing more cheaply (though the time-switch device would be useful were it much more accurate at the very short intervals).

EXPOSURE METERS

Many owners of photo-electric type exposure meters will find, when they come to use the new super-speed films that have appeared on the market since their meters were purchased, that the metal dials of their meters are not marked to include high emulsion speeds. Weston and General Electric will, however, install new dials which cover the highest emulsion speeds now available on their meters. Weston's charge is \$2.30 delivered, plus a charge of approximately \$1.50 if the meter requires repairs or recalibration; G.E.'s charge is \$2.50 for a new dial or \$1 if the meter is repaired at the same time and a repair bill incurred. Subscribers not wishing to incur this expense, which seems to be high, can obtain from Weston instruc-

tions for operating their Models 650 and 617 with high-speed films with the existing dial markings. G.E. may also be able to supply similar information for their meters.

Inasmuch as no films are now listed at speeds in excess of 128, a simple method for using the *Weston 650* with films having rated speeds greater than 64 is to set the meter at one-half the rated film speed and use the marking "A 1/2," instead of the arrow, opposite the light value. Another method, using the arrow as indicator, is to mark the needed additional emulsion speeds on the calculating dial. This is very easily done; for example, a film with a speed of 64, with light reading of 16, takes 1/40 sec. at f:5.6; now set the f:5.6 to 1/80 sec. instead of 1/40 and turn the two movable calculating dials together until the arrow again points to 16; at this spot on the emulsion speed dial (through the window) mark 128, and so on.

It is a most interesting observation that, formerly, the top emulsion speed shown on Weston meters calculating dials was 64, and, in March 1938, no rating faster than 64 was shown for any film. Now that the new *Weston* instrument gives readings to 250, similar emulsions nominally of the same speed are rated much faster. *Agfa Superpan Press*, formerly rated 64, is now assigned a rated emulsion speed of 125; even *Verichrome*, formerly with a daylight rating of 16, is now rated 32. Though presumably the films have not changed, to the layman they appear to be faster. Weston's explanation of these large changes in rated emulsion speeds is, to an extent, reasonable for *minicam work*. These new ratings will give thinner negatives, and thin negatives lend themselves rather better to enlarging and, as a rule, show better resolution. The miniature worker, however, is "between the devil and the deep blue sea," for he must obtain the best possible resolution to assist in the, to him, almost impossible task of getting a sharp print of good size, and, at the same time, must contend with the fact that underexposure is bound to give him a poor range of tones.

From the scientific point of view, the extent of permissible error is large. Any exposure is correct so long as all the densities of the negative are somewhere on the straight part of the film's characteristic. But the amateur, who is likely to be literal-minded about such matters and to give much greater weight to the readings of an instrument than to a decision arrived at by any other method, may be disappointed by the lack of precision obtained at the high price asked for such meters. This point cannot be too strongly emphasized, for, first, we have the expensive fallacy of the much advertised "precision" in a situation where the latitude of the film makes precision of little value. Second, we have the possible great error in the average light value for a scene given by meters of this type unless used with more discretion than is usual or practicable. Finally, we have the fallacy of assuming "precision" in the action of a mechanical shutter of great complexity and inherent variability of action. ¶Perhaps those who have been relying upon exposure meters as though they were precision instruments, may correct their understandings of instrumental accuracy by this arbitrary modification equivalent to a 100 percent change of meter calibration, and realize that exposure meters should be considered merely as a guide to be supplemented by experience and the personal taste of the user as to type of negative wanted.

Previously Issued

FOR the benefit of new subscribers, the contents of CR *Bulletins* previously issued during the current volume year are briefly listed. Issues which are marked "Not Confidential" may be purchased by those who are not subscribers. All *Bulletins* are 30c the copy.

OCTOBER 1938 (Not Confidential)

- "Owning vs. Renting an Automobile"
- "Toothbrushes"—ratings of 17 brands.
- "Household Glues, Cements, and Liquid Solders"
- "Automobile Storage Batteries"—ratings of 7 brands.
- "Telephone Sets"—ratings of 6 low-priced models.
- "Shoe Laces"—ratings of 18 brands or types.
- "Exterior Paints: Paste and Semi-Prepared"—ratings of 5 brands.
- "Men's and Women's Leather Shoes"—general discussion of construction and care; ratings of 14 makes of women's shoes and 14 makes of men's shoes.
- "Arsenic Spray Residues"

NOVEMBER 1938

- "Christmas Cards"—directions for making photographic Christmas cards or having them made.
- "Enlargers"—ratings of 15 makes of photographic enlargers.
- "Mouthwashes and Antiseptics"
- "Electric Lamp Bulbs"—ratings of 11 bulbs.
- "Phonographs Again?"—general discussion and listings of 3 record-playing attachments and 2 record-playing accessories.
- "Fruit Growers Win — Consumers Lose"—discussion of the increase in the tolerance limit for lead on fruit.
- "Home Building"—first in a series of discussions on problems facing the consumer who plans to build a house. Deals with selection of materials: wood and logs.

DECEMBER 1938

- "Christmas Tree Lights"—ratings of 13 sets.
- "Chocolates"—ratings of 8 brands.
- "Men's Socks"—ratings of 10 brands.
- "Cameras"—new listings of 10 miniature, 5 small, and 2 single-lens reflex cameras.
- "A Critical Estimate of Three Modern Pianos"
- "Leather Billfolds"—ratings of 11 makes.
- "Buy the Right Toys This Christmas"
- "Table-Model Radios"—ratings of 24 sets.
- "Electric Food Mixers"—ratings of 9 makes.
- "Home Workshop Equipment"
- "Local-Station High-Fidelity Receivers"—ratings of 3 sets.

JANUARY 1939 (Not Confidential)

- "An Engineer Looks at 1939 Automobiles"—general discussion of new features seen at the auto show.
- "Scale-Model Railroads"
- "Muslin Sheets and Pillowcases"—ratings of 10 brands.
- "Photographic Enlarger"—discussion of 1 brand.
- "Comparative Costs of Developing Photographic Films"
- "A Further Report on Gas Ranges"—ratings of 2 brands.
- "Men's Shirts"—ratings of 17 brands.
- "Inner-Tube Repair Kits"—ratings of 15 brands.
- "Photographic Accessories: The Photoflash Synchronizer"—ratings of 10 makes or types.
- "Home Building II: Concrete and Masonry"

FEBRUARY 1939

- "Automobiles of 1939"—ratings of 51 cars.
- "Winter Gasolines"—ratings of over 50 gasolines.
- "Automobile Oils—Winter Grades"—ratings of 36 brands.
- "Washing Machines"—ratings of 7 machines.

MARCH 1939

- "Automobile Polishes and Waxes"—formula for making wax and ratings of 22 polishes, 8 pre-wax cleaners, and 8 waxes.
- "Sewing Machines"—discussion of what to look for and ratings of some 30 machines.
- "Photographic Developers"—ratings of 10 brands; and 1 combination developing and fixing solution.
- "Automobile Tires"—8 brands listed.
- "Recorded Music"—what kind of records to buy, where to buy them, care of records, and recommended album sets.
- "Home Building, III: Metals, Foundations, Frames"

CR's Cumulative Index

Information appearing in CR's *Bulletins* September 1935 through September 1938 has been carefully indexed. 24 pp, 10c

In Which of These Articles Do Your Friends Show An Interest?

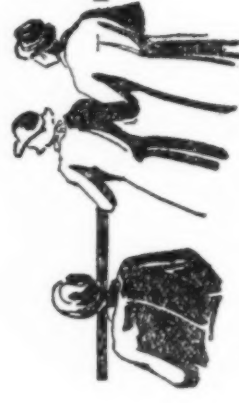
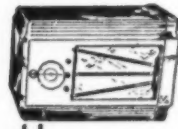
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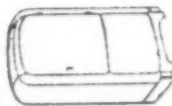


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You know, of course, that the advertising of Consumers' Research has been refused by many publications of wide distribution. The obvious reason, in most instances, for this discrimination against CR's desire to familiarize consumers with its services is the fact that all too often the unbiased findings of CR upon the merits of advertised products do not correspond with their advertised claims. Consumers' Research must look to you, therefore, to serve your own interest by familiarizing your friends with the way in which CR functions as an agency for protecting their health and pocketbooks. More subscribers means more money for research; in this way CR can constantly increase the scope of its service to you.

The present *Bulletin* is not confidential. It may be shown to friends and will convey to them some idea of the value of CR's money-saving

data for them. But urge them to subscribe now in order to have, as soon as issued, CR's forthcoming reports on small pianos, bicycles, tennis rackets, electric roasters, summer gasolines, refrigerators, building materials, and other products which are planned for early issues. Please hand them the order blanks below.



"The time has come," the Walrus said,

"To talk of many things:

Of shoes—and ships—and sealing wax—

Of cabbages—and kings—

And why the sea is boiling hot—

And whether pigs have wings."

The Walrus, of course, was not looking for money-saving information but merely things to talk about! But friends who are interested in less fantastic combinations than those of the Walrus—who want information about shoes and care little about kings—will almost always find it, as you already know, in one of the *Bulletins* of Consumers' Research. We look to you, month in and month out, to remind them of what CR has to offer. We look to you to say the right word at the right time, as always.

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Other Subjects Discussed

April, 1939

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Fresh Paint for the House
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Now 15c March, 1939 Now 15c
CONSUMERS' DIGEST

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ROLLER SKATES

ROBINS, April showers, bluebirds, crocuses, marbles, skipping ropes, and roller skates—Spring! Most of these are free to anyone who goes out of doors to find them. The lucky child needs only a small investment in marbles and wins more (though of course he may lose, for marbles, in common with many businesses, is a profit and loss proposition). The skipping rope is usually mother's old clothesline; roller skates, however, must be bought and they represent a sizable expenditure where there are several children in the family.

For the benefit of those intending to buy roller skates this spring, CR has been trying to find out what the prospective purchaser might use as indications of quality when he is making the sort of visual examination customarily possible. Eight pairs of roller skates were included in the tests just completed; only ball-bearing skates were bought as it had been found in previous tests that the so-called beginners' skates (cheap skates without ball bearings) had such poor durability that it didn't pay to buy or to test them. Three types of tests were run on the skates: visual tests (critical examination), physical tests of endurance, rigidity, wheel friction, and actual use tests.

In the visual test, the skates were lined up on a laboratory bench and five rollerskating enthusiasts looked them over with great care; notes were made of their comments on each pair of skates. At the conclusion of their observations, each of the five persons chose the pair of skates which she would buy; it was interesting to note that on the basis of visual examination only two persons agreed in their judgment of the best pair out of the eight.

The same group of people, on the following day, used the skates on a good smooth concrete floor and again made notes and comments and this time designated first and last choices on the basis of the use-test. Results of these choices were amusing when compared with choices made by the same people the day before, as there were almost no points of agreement between the choices based on visual examination and those based on practical use. It was interesting to note, however, that use-tests and physical tests agreed very closely.

The first of the physical tests was an endurance test on a specially designed machine in which one skate of each pair carrying a load of about 67 pounds, approximately the weight of an average eight- or nine-year-old child, was run on a cement surface for a distance of approximately 145 miles. The skates were all kept properly oiled throughout the test. Wheel friction was tested by putting both used and unused skates of each brand on an inclined plane. The angle at which the plane was inclined was increased gradually until each skate (adjusted to uniform weight) just started to roll down the plane and the angle of the plane was recorded. An appreciable increase in wheel friction, found after the 145-mile endurance test, was taken as an indication of ball-bearing wear. Only one brand of skates was found to have failed appreciably

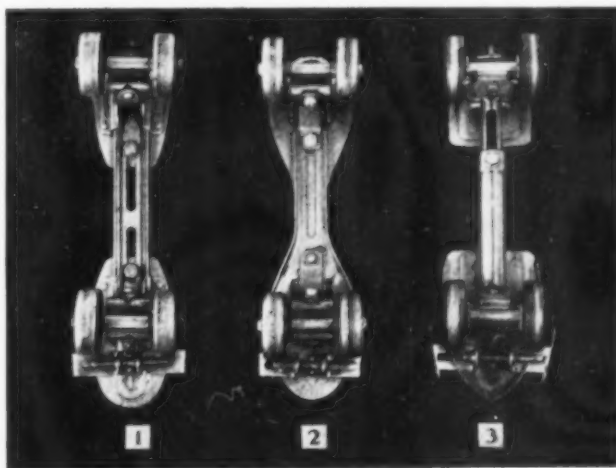
in this respect. The rigidity of the "arch" of each brand was measured by suspending a weight of 100 pounds from the center of the skate and measuring the deflection. This was done with all the skates extended to a uniform length. After assembling and studying all the data from the three types of tests, the following points appear as fairly reliable guides in buying.

Cylindrical wheels with square unchamfered edges, such as are used on *Wards Supreme* skates, make the skates definitely unsatisfactory to some. CR has no information as to the endurance of such "Dreadnaught" wheels, though it would appear to be good, but rounded-tread wheels make for much smoother, easier skating. The kind of wheels found on Chicago *Flying Scout* skates, whose rim section consisted of a piece of metal crimped about and riveted to a central web portion, was judged to be the most durable. The newer "one-piece" wheels that have a cross section which is not symmetrical about a vertical plane, have such deep recesses in the inner faces that they are apt to pick up mud, cinders, etc., when their users happen to skate off the sidewalk.

Straps that are adjustable to any size ankle, being pulled up through buckles which catch and hold them at any point, were judged much to be preferred, on the score of convenience, to straps with buckles which fastened into holes punched at regular intervals; these last, being not precisely adjustable, often have to have more holes punched to make them fit.

Straps in two pieces, such as those on the *Winchester* skates, with each piece riveted to a side of the heel plate, were judged to be impractical. Straps wear out frequently and whereas one-piece straps can be bought and slipped into place by anyone, a two-piece strap which needs to be riveted on would have to be taken to a shoemaker or hardware store for replacement.

Of the three kinds of "arches" commonly found



Some of the types of frames used in roller skates

on roller skates, the ribbed channel arch (Fig. 1) was found to be superior. The particular type of arch shown in Figure 2 was found to bend rather too easily, whereas both the ribbed channel type of Figure 1 and the tubular type (Fig. 3) were relatively rigid (flexurally). When skates with the tubular type of extension forming the "arch" were lengthened or shortened, however, there was so much play at the adjustment screw, that it was very easy to tighten up the skate with the front and back portions sufficiently out of line to make skating difficult if not impossible.

The fact that some skates do not rest solidly on all four wheels did not seem to the users of any great importance (because of the cushioning effect of the rubber between the foot plate and the axle bracket); nevertheless, one might be inclined to avoid skates so made because of the indication of a degree of carelessness in manufacture and inspection.

The long "streamlined" toe clamps found on *Wards Supreme* and Sears' *Flyaway* skates seemed an advantage to some users who felt that they would not tend to tear the soles of the shoes as much as the shorter clamps. Other users thought they were a disadvantage because they crowded the toes more than the shorter clamps. CR considers that this may be a matter on which one should decide personally, to suit the requirements of his own shoes and feet.

Ratings are based on data assembled from all tests made and are CR 39.

A. Recommended

Speedee, Cat. No. 6—1115 (Advance Mfg. Co., Milwaukee; sold by Sears, Roebuck & Co.) \$1.39 plus transportation. This number is not listed in Sears-Roebuck latest catalog, but Cat. No. 6—1126, at the same price, appears to be very similar. Did not begin to show wear in the 145-mile endurance test until 118 miles, when the wheels developed a slight wobble. Judged one of the best skates in the use-test. **1**

Flying Scout (Chicago Roller Skate Co., 4406-58 W. Lake St., Chicago) \$2.25. Sold through rollerskating rinks. Skates were in excellent condition at end of the 145-mile endurance test. Judged one of the best skates in use-test. Toe clamps could be adjusted from either side. Probably the most desirable of the group tested. **3**

B. Intermediate

Wards Speedline, Cat. No. 60—4970. (Distrib. Montgomery Ward & Co.) \$1.29 plus transportation. Began to show serious wear at 113 miles. In use-test, was rated fairly good. Toe clamps could be adjusted from either side. This skate, bought out of Ward's winter 1939 catalog is not listed in their latest spring catalog. Cat. No. 60—4980 skates at \$1.49, which have been substituted for the skates in CR's test, have, as pictured in the latest catalog, cylindrical, unchamfered wheels, which would be definitely unsatisfactory to some and might warrant rating the skates *C. Not Recommended*. **1**

Rollfast (D. P. Harris Hardware and Mfg. Co., Inc., Reading, Pa.) \$1.59. Skates were in excellent condition at end of 145-mile endurance test. Judged very good in use-test. Center arch judged not strong enough to carry heavy load, but skates would probably be suitable

B. Intermediate (contd.)

for children weighing less than 100 lb. **2**
Winchester Boys No. 3831 (Winchester Repeating Arms Co., New Haven, Conn.) \$1.69. Showed serious wear at 90 miles. Toe clamps could be adjusted from either side. Had a strap arrangement in two pieces, deemed impractical; straps not as fully adjustable as is desirable. **2**

C. Not Recommended

Globe No. 84 (Globe-Union Inc., 900 E. Keefe Ave., Milwaukee) \$1.89. Judged to have short life-expectancy, as they showed serious wear at about 66 miles. **2**

Wards Supreme, Cat. No. 60—4975. (Distrib. Montgomery Ward & Co.) \$1.89 plus transportation. Judged by users as awkward to use because of cylindrical, unchamfered (non-rounded) wheels. The only skates in the test which showed serious deterioration of bearings as indicated by increased wheel friction. **2**

Flyaway, Cat. No. 6—1113 (Advance Mfg. Co.; sold by Sears, Roebuck & Co.) \$2.89 plus transportation, including grease gun. Serious wear at 53 miles. Tubular extension pieces forming the "arch" deemed an unsatisfactory arrangement (see text). Equipped with grease-injection fittings. **3**

—CR—

Subscribers Can Help in Selection of Brands for Test

No matter how much money is available for tests, it is unfortunately impossible to please all our subscribers. We feel, however, that if a greater number of them would tell us what *kinds* of goods or services they wish reported on and what *brands* they are most interested in, the funds available for testing could be used in more direct relationship to their needs, and the scope of our service materially broadened.

Some groups, particularly hobbyists, are more outspoken as to their needs than others; this tends to give more emphasis to their wants than to those of the less articulate but more typical consumers. We have, for example, received a great number of requests to continue and expand our series on photography. Yet we have hesitated to devote a part of each *Bulletin* to this subject, realizing that there must be an unduly large proportion of subscribers who have no interest whatever in this subject, as compared with the apparently large number of photographic enthusiasts who write about their wants. This is, of course, because the hobbyist or professional expert in any field knows better than others that it pays to have and to use reliable, accurate information.

If there are any particular subjects or brands in *wide distribution* which you would like us to investigate and report on, send us a card giving us the needed information. In naming brands, please give full and exact name and maker's name, and send advertising material or claims made for the article, if practicable.

HOME WORKSHOP TOOLS

CONSUMERS' RESEARCH has tested a variety of tools useful in the home workshop and for making repairs around the house. In this *Bulletin* the results of the tests on hammers, pliers, nail sets, and auger bits are briefly reported. Tests on other tools will be reported in a forthcoming *Bulletin*. We shall welcome suggestions from those interested as consumers in particular kinds of tools for household use.

A heavy chromium plating makes a desirable rust-resisting finish for all tools; it is especially important with tools such as auger bits, where a smooth surface is essential to easy operation.

Claw Hammers

Requirements for a good hammer: The head should have a very hard surface so that it will not be dented while in use, but not so hard as to chip and endanger one's eyes. The best heads are made of hardened forged steel, which sometimes contains a hardening element such as manganese, or vanadium. The claws should be tough and elastic so that they will not break easily if accidentally hit against something hard, nor become permanently deformed by any load that might be normally applied to them. The head should be symmetrical (especially the striking surface so that it will not glance off the nail) and be resistant to rusting and corrosion. The handle should be strong and tough, and preferably be made of hickory. The hammer should be well balanced and should feel comfortable when held with the hand near the end of the handle, in the normal position in which it is to be used. The shape of the head is a matter of personal preference. The average user, however, will probably prefer claws which slope well back toward the handle and become, at their end, almost parallel to it.

In CR's test, hardness of the head and claws of each hammer, resistance of the claws to becoming bent, and the moment of force required to break the handle where it entered the head were measured. The hammers were also examined carefully for workmanship. The average Rockwell hardness (on the C scale) of the heads of the hammers listed under *A. Recommended* and *B. Intermediate* was 55. The moment of force required to break the handle varied from approximately 700 inch-pounds for the *Woolworth* hammer to 2200 inch-pounds for the *Arrow*. The hammers had nominal 16-ounce heads and hickory handles unless otherwise stated. All ratings are cr 39.

A. Recommended

Craftsman, Cat. No. 9—3814 (Distrib. Sears, Roebuck & Co.) \$1.15 plus postage. Head plated. Claimed to be vanadium steel. 3

Wards Master Quality, Cat. No. 84—1511 (Distrib. Montgomery Ward & Co.) \$1.15 plus postage. Head plated. Claimed to be vanadium steel. 3

B. Intermediate

Arrow (Arrow Tool Co.; sold by F. W. Grand stores) 50c. Head partly painted. Resistance of claws to becoming bent not fully satisfactory. Resistance to rusting judged poor. Considered, however, good value at price. 2

Cheney Nailer 938 (Henry Cheney Hammer Corp., Little Falls, N.Y.) \$1.25. Head polished. Resistance of claws to becoming bent not fully satisfactory. Resistance to rusting judged only fair. 3

C. Not Recommended

Drop Forged (Distrib. F. W. Woolworth Co. stores) 25c. Head painted. Handle made of ash (undesirable). Hammer head relatively soft and easily dented. Handle less than half as strong as the average of the other hammers tested. Resistance to rusting judged poor. 1

Pliers

Pliers should be forged of high-grade tool steel and properly hardened by suitable heat treatment. They should open and close easily but without detectable sidewise play; the two jaws should be in good alignment when closed and should be in correct relationship over their entire length. Handles should be ductile and strong enough to withstand, in the case of 5½-inch pliers, a force of 165 pounds applied to the handles at the point of their widest separation when the jaws are gripping a small rod or wire; the pliers should not show any evidence of damage after this test. Cutting edges should be sharp, and hardened so as to cut "plow steel" wire approximately 1/16 inches in diameter without being visibly dented.

In CR's test, ten brands of pliers were tested for hardness of the head, joint section, rivet, and handles, and were subjected to the 165-pound handle load with the jaws gripping a ¼-inch drill rod in the case of the long-nose pliers, and gripping copper wire 1/6 inch in diameter in the case of the cutting pliers. Six of the pliers, equipped with proper cutting jaws, were also tested for ability to cut plow steel wire. Some of the pliers were made with slip joints permitting the jaws to be opened extra wide when needed. In the commonest type of slip joint, a small bolt and nut were used instead of a rivet, an undesirable arrangement, for the nut may work loose in use, lacking any safeguard to prevent loss and coming apart. In general the pliers were found to be poorly made. Poor manufacturing control was shown in most cases by the fact that the two halves of the tool had widely different hardness numbers. Rivets, handles, and joint sections were in most cases too soft. All ratings are cr 39.

SIDE-CUTTING PLIERS

A. Recommended

Wards Master Quality, Cat. No. 84—2154 (Distrib. Montgomery Ward & Co.) \$1 plus postage. Length 6

A. Recommended (contd.)

in. Well made. Had hardest cutting edges of pliers tested. Strength of handles and jaws satisfactory. This size not listed in latest catalog but 7 and 8 in. sizes of same plier available at \$1.25 and \$1.49 plus postage respectively. **3**

C. Not Recommended

No brand name (marked Made in Germany by Elliot Cutlery Co.; distrib. F. & W. Grand stores) 20c. Length 6 in. Slip-joint type. Workmanship fair. Strength of handles and jaws satisfactory. Cutting edges dull and soft. **1**

Bruno-Will (Made in Germany; distrib. F. W. Woolworth Co. stores) 20c. Length 7½ in. Slip-joint type. Workmanship poor. Strength of handles and jaws unsatisfactory. Cutting edges dull and very soft. **1**

Barcalo (Barcalo Mfg. Co., Buffalo; distrib. F. W. Woolworth Co. stores) 40c. Length 7½ in. Workmanship fair. Strength of handles and jaws satisfactory. Cutting edges very soft. **2**

Eclipse, Cat. No. 84-2180 (Distrib. Montgomery Ward & Co.) 39c plus postage. Length 6 in. Workmanship fair. Strength of handles and jaws satisfactory. Cutting edges very soft. **2**

Merit, Cat. No. 9-4489 (Distrib. Sears, Roebuck & Co.) 37c plus postage. Length 6½ in. Slip joint of undesirable type. Workmanship poor. Strength of handles and jaws unsatisfactory. Cutting edges dull and did not meet. Listed under the name *Dunlap* in latest catalog, catalog number being the same. **2**

PLIERS WITHOUT SIDE-CUTTING EDGES BUT HAVING WIRE-CUTTING SLOT**B. Intermediate**

No brand name (Distrib. F. & W. Grand stores) 10c. Length 6½ in. Slender alligator jaws 1¼ in. long extending beyond small pipe jaws. Nickel plated. Workmanship fair. Strength of handles and jaws did not meet specifications given in text, but as obviously designed for light work, judged satisfactory. **1**

C. Not Recommended

Drop Forged (Distrib. F. & W. Grand stores) 20c. Length 6½ in. Slip joint of undesirable type. Workmanship poor. Strength of handles and jaws unsatisfactory. **1**

Forged Steel (Distrib. G. C. Murphy stores) 20c. Length 6½ in. Slip joint of undesirable type. Workmanship poor. Strength of handles and jaws unsatisfactory. **1**

Lakeside, Cat. No. 84-2200 (Distrib. Montgomery Ward & Co.) 25c plus postage. Length 6 in. Slip joint of undesirable type. Workmanship fair. Strength of handles and jaws unsatisfactory. **1**

Nail Sets

A nail set should be regular and symmetrical in shape and accurately finished. It should be well hardened. A nail set which has been properly hardened will, of course, not be dented nor will its cupped edge be bent by any force which one can apply with a piece of soft or moderately soft steel; this fact offers a ready means for crudely testing a nail set. The blued surface of a good

nail set is due to chemical action in the metal itself and not to the application of a lacquer. A lacquer finish can be detected by scratching—even with a fingernail.

Three brands of nail sets were tested for compliance with *Federal Specification for Nail Sets—GGG-N-71*, November 15, 1932, and in addition were given Rockwell tests for hardness. All three brands failed to meet Federal Specifications in important respects. On all, the blued surface was deceptive, being a finish applied by means of lacquer, instead of a coloration due to heat-treatment of the steel. All ratings are cr 39.

B. Intermediate

Mechanic (Distrib. S. S. Kresge stores) 40c for set of four in sizes 1/32 in., 2/32 in., 5/64 in., and 3/32 in. **2**

C. Not Recommended

Montgomery Ward & Co., Cat. No. 84-1119. 29c plus postage for set of four in sizes 2/32 in., 3/32 in., 4/32 in., 5/32 in. **1**

Millers Falls (Millers Falls Co., Greenfield, Mass.) 60c for set of four in sizes 1/32 in., 2/32 in., 3/32 in., and 4/32 in. **3**

Auger Bits

Auger bits should be of a good grade tool steel. Cutting edges should be sharp and clean-cut. Grooves and twists should be well formed and polished. Double-twist bits are designed for fine work; single-twist bits are intended for ordinary rough work.



1. Single-twist, solid-center auger bit



2. Double-twist auger bit

In CR's test, five brands of auger bits were tested for compliance with *Federal Specification for Auger Bits—GGG-A-801*, and in addition were tested for hardness of the cutting edges and of the shank; each was given a practical use test, also. With one exception, as noted, they were all single-twist, solid-center bits. Finish of the bits, with the exception of those rated A or B, was poor. All ratings are cr 39.

A. Recommended

Russell Jennings (Russell Jennings Mfg. Co., Chester, Conn.) 60c for ½-in. size. Double-twist. Polished fairly well but not plated. Cutting edges hard. Workmanship and performance good. **3**

B. Intermediate

Craftsman, Cat. No. 9—4175 (Distrib. Sears, Roebuck & Co.) 38c plus postage for ½-in. size. Well and smoothly finished, with chromium plating. Cutting edges medium hard. Performance fairly satisfactory, but cutting speed somewhat slow. **2**

C. Not Recommended

Blue Banner (Distrib. F. W. Woolworth Co. stores) 20c for ½-in. size. Actual diameter was considerably larger than marked size. Cutting edges soft and easily dulled. Threads of screw tip, not sharp. In use test, grooves became choked with chips, requiring auger to be removed and cleaned. **1**

Fulton, Cat. No. 9—4165 (Distrib. Sears, Roebuck & Co.) 23c plus postage for ½-in. size. Actual diameter was considerably larger than marked size. Cutting edges soft and easily dulled. Threads of screw tip were badly formed. In use test, grooves became choked with chips, requiring auger to be removed and cleaned. **1**
No brand name (Made in Germany; distrib. F. W.

C. Not Recommended (contd.)

Woolworth Co. stores) 20c for 10/16-in. size. Actual diameter was considerably larger than marked size. Cutting edges very soft and easily dulled. In use test, grooves became choked with cuttings, requiring auger to be removed and cleaned. **1**

* * *

The selection of the brands of Home Workshop Tools admittedly leaves much to be desired; the present report should be regarded as preliminary, in respect to the brands covered. Preparatory work in devising methods of tests and standards were necessary before more complete tests could proceed; it was felt that subscribers would like to have the advantage as soon as possible of the data obtained on brands most easily available. If subscribers are interested, much additional work will be done on Household Tools; and we expect to include such brands as *Stanley*, *Millers Falls*, *Disston*, *Atkins*, etc. We shall welcome suggestions as to selection of these and other brands.

HOME BUILDING

IV

Roof Coverings

NEARLY any commercially produced roof covering, laid with a fair degree of workmanship, will exclude the elements for a period of a few years, a year or two at worst. But a roof is exposed to severe deteriorating effects—heat and cold, rain and snow, sunlight and wind—and is well worth some additional investment above that usually made by speculative builders, in order to avoid costly leakage or expensive maintenance. Choice of any roof covering should be made with great care.

Pitch or slope of the roof largely determines the type and cost of roofing materials. Appearance of the roofing becomes less important as the pitch is lower but the performance demanded of it becomes much more exacting. The lowest-cost roof, though not necessarily the best, is one of relatively low pitch (in northern regions it is desirable to have a pitch steep enough to shed snow easily), simply framed to avoid hips, valleys, and complex flashings, and covered with wood shingles. A service life of thirty or forty years for such roofs is not uncommon when well cared for.

The advice the consumer receives about maintaining or repairing the roof of his house is probably more unreliable than that applying to any other

part of the structure because he will rarely go to the trouble of climbing up onto it to see whether it needs complete re-roofing, as the contractor claims, or only a few minor repairs. Often costly repair bills arise because the owner has neglected to follow, as a matter of routine, a low-cost maintenance treatment of painting or making minor repairs every two or three years.

WOOD SHINGLES

Wood shingles are in bad repute in some states because, being quickly inflammable, they provide a vulnerable point for the starting of fire; a number of cities

have prohibited their use by legislation. Yet use of wood shingles has been continued in some regions even after a severe conflagration, on the theory that wood-shingled roofs were but a minor factor in the spread of the flames. A part of the fire hazard arises from the use of a thin, flat-grained, easily curling shingle and the owner's failure to replace roofing which has outlived its usefulness. Wood shingles when afire may produce brands easily carried by the wind to start other fires. As the shingles wear due to weathering, fine fibers stand out and are tinder for any stray spark. In some of the southern states a fine moss grows on

THIS is the fourth of a series of articles on home building scheduled to appear in *CR's* monthly Bulletins. Others dealt with wood, concrete, masonry, metal as construction materials, foundations, and frames. Forthcoming articles will discuss, in sufficient detail for most consumers' purposes, wall coverings, floors and floor coverings, heat and sound insulation, doors and windows, interior trim and cabinet work; a bibliography will also be provided of important references on the subjects treated.

the surface during the wet months and then dries in midsummer. This drying, in the summer, adds greatly to inflammability.

To avert the likelihood of "fuzzing" and curling, edge-grain and thicker shingles are being promoted. Wood-shingled structures often carry a higher rate of insurance, about 5 percent for homes in the country. Nevertheless, in most parts of the country, wood shingles are still used in enormous quantities because they provide perhaps the most pleasing of cheap roofing materials. They have also considerable heat-insulating value, which many other roofing materials lack.

Wood shingles are most commonly made of cypress, western red cedar, and redwood. Red cedar is particularly durable, strong, lightweight, fine-grained, and low in expansion and contraction; these shingles give minimum warping, twisting, and curling. Other shingle woods are northern white cedar and southern pine.

The product of reputable producers is graded under standards established by the U.S. Department of Commerce (*Commercial Standards CS 31-38*, 5 cents from the Supt. of Docs., Washington, D.C.) and bears a label certifying to this fact. The thickness of shingles is expressed as the number of butts required to measure two inches, thus 5/2 means 5 butts equal two inches. No shingle poorer than No. 1 (all heartwood, all edge-grain), and thinner than 5/2, should be exposed on roof or side wall. Do not put your trust in fancy and unstandardized grade names such as "extra clear." In order to last as long as the wood, nails should be of copper or hot-dipped zinc coated; if the latter, the gauge should be nails of 14-gauge and 3-penny. Such superior nails cost little more than blued-steel nails and will pay for themselves. Shingles are often laid on strips set on five-inch centers, but some cities require solid-laid sheathing. Since shingle woods are naturally durable, the spacing is not necessary, at least in northern or dry southwestern regions, and is not to be favored for it invites high heat losses through the roof. Shingles should not be used on roofs having a pitch of less than 4 in 12, and should be laid not over 5 inches to the weather for the 16-inch lengths. Manufacturers' specifications and building codes should be consulted for installation procedure.

For some years, and following the practice of sheet-roofing producers, old roofs have been re-roofed with shingles without removing the old ones. This is known as over-roofing and has the advantage of less litter and dirt and less time in laying and gives added heat insulation. For over-roofing, 5-penny rust-proof nails should be used. To retain the original architectural effect, shingles should be removed in a border 2 to 4 inches wide around the edge of the old shingle roof and replaced with strips. Directions for over-roofing are available from the shingle manufacturing associations (California Redwood Assn., San Francisco; and Red Cedar Shingle Bureau, Seattle).

If a color effect is desired creosote shingle stains may be used. Staining with oils containing creosote causes shingles to last longer, lie flatter, and have a lower fire hazard. If a pigmented paint is used, it

should not be applied so heavily as to form heavy daubs or dams where the shingles contact one another. Painting has the advantage of taking the wear brought on by the constant attrition of rain and wind; it also aids shingles to stay flat. Some paints have high fire-resisting qualities. Stains and paints lose their effectiveness in five or more years, depending on their quality, but are easily renewed at moderate cost.

Most shingle manufacturers are members of the Red Cedar Shingle Bureau and do not market their product under separate trade names. A few important producers or distributors are: Aloha Lumber Co., Aloha, Wash.; John McMaster Shingle Co., Marysville, Wash.; Bloedel-Donavan Lumber Mills, Bellingham, Wash.; Clark & Wilson Lumber Co., Linnton, Ore.; The Long-Bell Lumber Co., Longview, Wash.; E.C. Miller Cedar Lumber Co., Aberdeen, Wash.; Schafer Bros. Lumber & Door Co., Montesano, Wash.; Seattle Cedar Lumber Mfg. Co., 1540 W. 46 St., Seattle; Weyerhaeuser Sales Co. (*Edham* shingle), First Nat'l. Bank Bldg., St. Paul; Samuel Cabot, Inc. (*Cabot's* shingle), 141 Milk St., Boston.

Prestained and preserved shingles are produced to lengthen life and save staining on the job. They are dipped or treated under pressure. It is doubtful if the consumer will save by purchasing such shingles; it is much more important to make selection by species and grade rather than by color or preservation, even though creosote preservative treatment, and staining with creosote stain at intervals are desirable.

B. Intermediate

Treated shingles of the following brands are reported to be reliable:

Cabot's (Samuel Cabot, Inc., 141 Milk St., Boston)
Creo Dipt (Creo-Dipt Co., Inc., North Tonawanda, N.Y.)
Edham (Weyerhaeuser Sales Co., First Nat'l. Bank Bldg., St. Paul) Stained under pressure in selected colors.

Cost of unstained red cedar shingles, laid, 6 to 10 cents per square foot; stained shingles, laid, 11 to 15 cents. The life of a good unstained wood shingle is about 15 to 20 years minimum.

►Ref: *Comparative Durability of Shingles and Shingle Nails*. The Pennsylvania State College, State College, Pa. A valuable reference.

SHEET METAL AND METAL SHINGLES

Metal roof coverings have the disadvantage of high heat conductivity, high cost, and of corrosion if made of iron or steel. Rusting usually starts with a small pit which gradually grows wider and deeper until a hole or break results. This rusting does not occur on a few isolated sheets only; usually, pitted places appear all over the roof, requiring complete replacement. Leaks may occur in metal roofs before they have become worn out, due to nails becoming loose or seams becoming raised. Such failures can be repaired temporarily but will ultimately give further trouble.

Sheet metal manufacturers have attempted to develop durable and easily applied metal roofing but have had difficulty in allowing for the necessary

expansion and contraction. Metal tile and shingles, corrosion-resistant, are the nearest approach to a solution of this problem.

Tin roofs are ordinarily made of what is known to the trade as 40-pound tin. Such roofs cost about 28 cents per square foot unpainted. They must be kept painted, but even so, will corrode from the under side. A sheet-copper roof (requiring no paint) will cost about 75 cents per square foot.

B. Intermediate

Anaconda (American Brass Co., Waterbury, Conn.) Copper roofing sheets to be placed in seamed strips 13 $\frac{3}{4}$ in. wide. Weight, 10 oz per sq ft.

Edwards (Edwards Mfg. Co., 529-549 Eggleston Ave., Cincinnati) Spanish style metal "tile," stampings of copper, copper-bearing galvanized steel, tin or zinc. The latter two are not recommended. Products include tiles, hips, valleys, flashings, etc.

Kenmar (New Haven Copper Co., Seymour, Conn.) Copper shingles. Corrugated sheets of shingle size with a deformed butt to imitate the appearance of a wood shingle. This manufacturer also produces other copper sheet products.

Protected Metal Sheets (H. H. Robertson Co., 1938 Winslow St., Pittsburgh) Iron sheets wrapped and sealed in an asphalted fabric. This material is better adapted to roofs of low pitch where the appearance factor is unimportant, particularly where a parapet wall conceals the roof covering entirely.

Porcelain-coated tile (Glass-Iron Tile Co., Detroit) Quite durable porcelain enameled sheets used principally on service stations and other commercial buildings, but adaptable to residences. Costly.

Leadtex (Revere Copper & Brass, Inc., 230 Park Ave., N.Y.C.) A lead-coated copper sheet, durable but costly. Must not be applied where water running from it is used for any household or farm purpose in any way whatsoever, because of the extreme toxicity of lead.

C. Not Recommended

Copperflex (American Brass Co.) This is *Anaconda* copper sheet with fabric backing, weighing 3 oz per sq ft. Applied in the same manner as roll roofing, to roofs preferably having a pitch steeper than 4 in. to the ft. Difficulty with raising of nails from the sun's heat.

Sheet-iron tile (Edwards Mfg. Co.) Painted sheet-iron. Corrodes quickly.

Zinc is not recommended as a roof covering because of its great expansion and contraction with changes of temperature, which may cause leakage and destruction of nailed joints.

SLATE

In its harder, thicker grades, slate makes an enduring and handsome roof. Its cost is exceedingly high, especially as the entire structure must be built deliberately heavy (or strengthened, in case of re-roofing) to support the great weight of the covering. Being highly conductive of heat, and heat-absorbent because of its dark color, a slate roof needs to be well insulated from rooms below. It is difficult to make repairs when slates get broken off by action of frost, hail, or wind. Vermont slate

is, in general, harder than that from Pennsylvania quarries. Red and green Vermont slates are relatively expensive.

Slate is also used for porch and terrace floors, walks, stepping stones, etc., in irregular shapes or random rectangular units. In crushed form it is used for walks and tennis topping.

Cost of laying slate roof, including the felt, copper nails, slate, and labor, runs from 20 to 40 cents per square foot for the thin to medium grades and up to 75 cents or more for the heavy to massive grades. Price for materials at the plant ranges from 8 to 15 or more cents per square foot.

B. Intermediate

Allenstone (Vermont Structural Slate Co., Fair Haven, Vt.) A good grade of slate. All standard patterns, full range of colors.

Buckingham (Buckingham-Virginia Slate Corp., 1103 E. Main St., Richmond, Va.) Low water absorption. Rustic or smooth texture. Thicknesses 3/16 to 1 in.; weight 750 lb per square (100 sq ft of covered area) to 3600 lb per square. Frequently laid in random thicknesses averaging about 1400 lb per 100 sq ft of covered area.

Genuine Bangor Slate (North Bangor Slate Co., Bangor, Pa.) Reported of uniform quality, with full corners on square-edge patterns. Straight cleavage. Patterns are standard, thatch, and random. Estimates following are for the useful life of slate: No. 1 Smooth Texture, 75 to 100 years; No. 1 Ribbon, 50 years; No. 2, 35 years.

Matot (H. A. Matot, Poultney, Vt.) Full range of sizes and thicknesses. Nine color classifications in green, gray, purple, and brown.

Sheldon (Sheldon Slate Products Co., Granville, N.Y.) Roofing slate and slate products of every description.

Texstone (O'Brien Bros. Slate Co., Inc., Granville, N.Y.) Rough texture. 3/16- to 3/8-in. thick, 10- to 22-in. lengths; random widths. Full range of slate colors.

Roofing slate (Rising and Nelson Slate Co., West Pawlett, Vt.) Architectural and commercial roofing slate. Manufacturer specializes in exceptional textures and color tones.

Roofing slate (Structural Slate Co., East Pen Argyl, Pa.)

CLAY TILE AND SHINGLES

A good tile roof has more heat-insulating value and is easier to repair than a slate roof. Soft tiles are to be avoided, for tiles should be strong enough to support the weight of a person walking on the roof. Since driving rains get under tile, it is essential to have a thoroughly watertight, preferably asphalt-mopped, heavy-felt under-roofing which serves as wind and moisture seal. To resist high winds or gusts, it is advisable to set tile with clips or in Portland cement mortar for anchorage; due to their rough and relatively open exposure, curved clay tile are frequently ripped loose by high winds when merely nailed in place.

Clay tile requires, as does slate, special roof framing to support the heavy weight. Tiles are commonly stacked in small piles on the roof as soon as framing of a house is complete, and before plastering, so that the structural frame will become adjusted to the weight.

Cost of good vitreous roofing tile, laid, 40 to 70 cents per square foot; glazed tile, 60 cents to \$1.25 per square foot.

B. Intermediate

Gladding-McBean (Gladding, McBean and Co., 2901 Los Feliz Blvd., Los Angeles) Full range of curved tile.

Hood Kil-Kraft (B. Mifflin Hood Co., Daisy, Tenn.) Burned clay roof coverings, flat shingle tile, Mission tapered, Mission, and interlocking tile. Seven shingle patterns. Five curved tile styles. This manufacturer also produces brick and floor tile.

Ludowici (Ludowici-Celadon Co., 104 S. Michigan Ave., Chicago) Flat shingles and curved tile. Wide range of textures and patterns, specialized reproductions of old-world roofs.

M-II (B. Mifflin Hood Co.) Clay tile roof coverings.

Murray (Murray Tile Co., Inc., Cloverport, Ky.) Flat shingles and curved roofing tile; the latter are produced in numerous patterns.

N-F-C (National Fireproofing Corp., 203 E. Ohio St., N.S. Pittsburgh) Clay tile roof coverings.

PORTLAND CEMENT TILE

Portland cement tiles are low in initial cost and can be made by the consumer. They cannot be recommended on account of low strength and unsatisfactory service.

ASBESTOS-CEMENT SHINGLES

Asbestos-cement shingles of long-fiber asbestos (a mineral) and Portland cement are made in various sizes and colors and in thicknesses which vary from 3/16 inch for standard to 5/16 inch for heavy grades. Asbestos-cement shingles are formed under high pressure and are rigid. Holes are made in them during manufacture for the nails used for fastening the shingles in place. Some types imitate wooden shingles even to the grain of weathered wood; others are surfaced with slate granules, black, green, and red. They are long-lived and as fire-resistant as slate or clay tile. There are three general styles: French pattern, American, and Dutch or Scotch lap. In the French pattern, the units are squares, laid diagonally. Loss of coverage due to overlapping is about 17 percent of the total area of the shingles. American units are shaped and laid like wood shingles. Loss of coverage due to overlapping may run up to 60 percent depending on the length of the shingles and the number of inches exposed to the weather; this need not, however, add to the cost of the completed roof. The American lap, moreover, provides greater fire resistance. In the Dutch lap, the shingles are laid square but the coverage loss due to the small amount of overlapping is only about 17 percent.

Asbestos-cement shingles are manufactured both "straight" and "tapered." Tapered shingles lie flat when overlapped—thus the American tapered shingles serve in themselves to exclude wind and weather. Constant-thickness shingles, when overlapped similar to wood shingles, are raised at the butt above the shingle below, permitting passage of moisture and lifting by the wind; this method of

laying should be avoided. If these shingles are used, a waterproof asphalt-felt surface should be laid before applying them.

The minimum pitch of a roof for asbestos-cement shingles should be 4 inches per foot for American lays and 5 inches per foot for Dutch or French lays. Siding shingles should be applied to vertical surfaces only.

Cost, laid, is 16 to 35 cents per square foot when copper nails are used.

B. Intermediate

Careystone (The Philip Carey Mfg. Co., Lockland, Ohio) Asbestos-cement shingles, processed under pressure, with wood-grain texture. Tapered shakes; wide individual shingles; French shingles; curved and random edges are offered; also siding shingles.

Eternit Timberex (Rubero Co., 502 Fifth Ave., N.Y.C.) A tapered asbestos-cement shingle for roof coverings and siding. "Cypress-textured" and colored to give the appearance of wood. Sizes 8 x 16, 16 x 16, and 12 x 24 in. Nail holes prepunched. American, Gothic, Dutch lap, and hexagonal patterns. Also siding shingles in shingle and brick-type patterns.

Flintkote (The Flintkote Co., 4113 R.C.A. Bldg., N.Y.C. and Pioneer Divn., The Flintkote Co., 5500 S. Alameda, Los Angeles) Individual and strip shingles.

J-M Asbestos Shingle (Johns-Manville Sales Corp., 22 E. 40 St., N.Y.C.) A very good grade of shingles. Various shingle patterns, solid, and blended colors. The *Salem* pattern is an attempt at the appearance of aged hand-hewn wood shingles.

K & M (Keasbey and Mattison Co., Ambler, Pa.) Tapered shingles. 18-in. long. Mixed widths 5 to 9 in. Weight, approximately 600 lb per square (100 sq ft of covered area). Many other patterns are produced. Standard solid colors. Wood-grain textures. Also siding shingles and other asbestos products.

Mohawk Tapered Asbestos Shingles (Mohawk Asbestos Shingles, Inc., 101 Park Ave., N.Y.C.) Patterned to resemble split-stone roof coverings, tapered shingles in colors, and different rustic, individualistic, and pleasing designs.

ASPHALT-FELT ROOF COVERINGS

Asphalt-felt roofing is of three types: *roll roofing*, *built-up roofing*, and *flexible shingles*. Manufacturers generally make all types. The process consists essentially of saturating felt which is made from rags or wood pulp, with tar pitch or asphaltum. The saturated felt is then coated with mineral or "natural" asphalt cement on the top surface and is finished with a covering of mica, sand, crushed slate, or other mineral granules.

Asphalt has long been used as a waterproofing, protective coating material. It is used as a weather repellent in manufacturing roof coverings; the mineral coating is the fire barrier. Asphalt will burn and when hot, in bulk is a highly hazardous substance. Burned in a fireplace, asphalt-felt shingles would burn more vigorously and throw out more heat than wood shingles; yet it is quite difficult to start a blaze with a burning brand on a roof made of mineral-surfaced shingles.

Tar pitch is sometimes used instead of asphalt. It has similar qualities. It cracks more easily than asphalt during cold weather and runs more easily during the summer's heat. Pitch and asphalt do not combine advantageously; hence, it is desirable to mop a pitch-saturated felt with pitch and to mop asphalt-saturated felt with asphalt.

Asphalt-felt roofings are commonly made to conform to standards of fire resistance established by the Underwriters' Laboratories, Inc. Classes are A, B, and C; Class A is best in fire resistance and Class C is lowest of the three. Copies of these standards and listings of manufacturers authorized to label their products may be consulted at the offices of the local fire underwriters, the city building inspector, or at the larger libraries. The Underwriters' label signifies compliance with certain minimum standards but is not to be taken as affording any guaranty of high quality. A high-quality product may lack the Underwriters' label.

The following manufacturers are reported to turn out reliable products: Amalgamated Roofing Co., 6620 S. Central Ave., Chicago; Barber Asphalt Corp., Barber, N.J.; The Barrett Co., 42 Rector St., N.Y.C.; Bird & Son, Inc., 1934 E. Clark, East Walpole, Mass.; The Philip Carey Mfg. Co., Lockland, Ohio; Certain-teed Products Corp., 101 E. 41 St., N.Y.C.; Johns-Manville Sales Corp., 22 E. 40 St., N.Y.C.; The Lehon Co., 4411 Oakley Ave., Chicago; Paraffine Companies, Inc., 475 Brannan St., San Francisco; The Flintkote Co., 4113 R.C.A. Bldg., N.Y.C., and Pioneer Divn., The Flintkote Co., 5500 S. Alameda, Los Angeles; Ruberoid Co., 502 Fifth Ave., N.Y.C.; U.S. Gypsum Co., 302 W. Adams St., Chicago.

Roll Roofing

Roll roofing is the cheapest of the asphalt-felt roof coverings. It is laid quite rapidly, is not commonly regarded as long-lived, but makes a serviceable low-cost roof which may last 10 to 20 years if a good grade is used. However, roll roofing is usually considered undesirable in appearance.

The Agricultural Experiment Station of the Iowa State College, Ames, Iowa, made a study of the factors determining the length of life of many brands of roll roofing and published the results in *Bulletin 304*, dated June 1933. This report concludes: "A good roll roofing should include the following desirable qualities: a felt with high tensile strength, a low loss in weight of the original material when it is subjected to heat at 149°F and a moderate amount of mineral surfacing in the form of sand or slate....Pitch in the sheathing, especially as concentrated in knots, has a very serious deteriorating effect upon the roofing, the bitumen or asphalt in the roofing being dissolved by the turpentine in the pitch. Pitchy knots may be covered readily with a coat of shellac and the larger knotholes covered with small pieces of sheet metal....The laying of roofing should preferably be done in warm weather; wrinkling and bulging will be reduced if laid while warm, flexible and expanded....The life of roll roofing can be prolonged if repairs are made frequently. The application of asphalt roof paint to the deteriorated areas replaces

a part of the asphalt which has scaled off or volatilized and holds the mineral surfacing in place."

The life of the roofings tested varied from 5 to 18 years; it turned out that the prices paid for the roofings gave little indication of actual durability. On the basis of these tests, it would be difficult to recommend any particular brand as of outstanding quality. The consumer, when purchasing roll roofing, is advised to make his price comparisons on the basis of equivalent weights per square; these will vary considerably. Geographical location is of importance; intense sunlight in the southern and desert portions of the United States makes the life of all asphalt roofing materials relatively short.

Where the roof must stand excessive exposure to the hot sun, the exposed nails fastening the roll roofing are raised in time, leaks occur, and hard winds get under the roofing and tear off large patches. The life of this form of roofing can be doubled if these nails are occasionally driven down and painted with asphalt, and other repairs made when needed. (For a list of manufacturers of asphalt-felt roof covering, please refer to a preceding paragraph.)

Cost, laid, of the 85-pound slate-surfaced grade is 3 to 5 cents per square foot. Asphalt felt in rolls costs from \$2.50 to \$4 per 100 pounds; somewhat higher for slate-surfaced.

Flexible Shingles

Flexible shingles are made from roll roofing and almost universally comply with Class C (minimum) Specifications of the Underwriters' Laboratories. They are made in various weights, surfaced on the exposed face with mineral particles in optional colors, and are preferably back-coated with asphalt cement. It is important that shingles be sealed at the edges to prevent "bleeding" or loss of the asphalt. In weights lighter than those established by the Underwriters' Laboratories, these shingles are apt to curl up at the corners.

Flexible shingles are available either singly or in strips of several shingles. The latter are preferable, as they are more quickly laid. They should be laid over a solid-sheathed surface. In reroofing, an old wood-shingled roof should be removed to the sheathing, despite any recommendations by the manufacturer to the contrary. Since asphalt roofs readily conduct heat, insulation can be used to advantage under them. In comparing costs of several roof coverings, service life and insulation value both warrant consideration. Heat leakage through the roof normally accounts for about one-sixth of one's coal bill.

Cost of flexible shingles, laid, 8 to 15 cents per square foot in plain colors; in blended colors, approximately 1 cent more. For separate shingles, American pattern, 11 to 17 cents per square foot; Dutch pattern, 8 to 10 cents per square foot. Manufacturers are listed in a preceding paragraph.

Built-Up Roofing

A very economical method of covering so-called "flat" roof decks and one which will give roof protection for fifteen years or longer is the following:

First, nail dry, seasoned, roof-sheathing thoroughly to rafters or other supports; cover knotholes with sheet metal. Next, lay a 30-pound saturated felt with suitable laps and stagger the nailing through flat tincaps (the more thoroughly the better); mop with hot asphalt, 25 pounds to the square (100 sq ft). Next, apply 15-pound saturated felt, not nailed; mop with hot asphalt; apply another layer of 15-pound felt, not nailed; and apply a final heavy top-mopping of asphalt. Cost, laid, is from 7 to 10 cents per square foot, depending on location and labor conditions. Crushed slag or gravel may be added as a final coat, but tends to clog roof gutters and makes difficult the recoating of the surface, which should be done every few years. Slag or gravel also makes difficult the discovery of leaks. Built-up roof coverings must be well flashed around parapet walls, vent pipes, etc. (For a list of manufacturers, please refer to a preceding paragraph.)

Several manufacturers specialize in built-up "15-year," "20-year," etc., roof coverings. These designations are established primarily for sales purposes. The roofing material of these companies

has not been noted to possess superior qualities corresponding to the years of service claimed.

CANVAS

Decks, balconies, and roof surfaces subject to footwear require a covering which remains waterproof despite the wear of traffic. Painted canvas is much used under such conditions. Another solution of this problem, which is successful in many instances, is to provide "duckboards" of wood slats over an asphalt built-up or a metal roofing.

A. Recommended

Con-ser-tex (Wm. L. Barrell Co., 40 Worth St., N.Y.C.)

Canvas (cotton fabric) treated and impregnated for durability. Cost of material is 14.5 to 18.5c per sq ft, depending on weight; Grade I, at 17.5c per sq ft, is most used for residences. Cost of laying is approximately 10c per sq ft.

► Ref: *Roof Coverings for Farm Buildings and Their Repair—Farmers' Bulletin No. 1751*. 5 cents from Superintendent of Documents, Washington, D.C. This is a valuable reference.



THUMB TACKS AND PUSH PINS

"FOR want of a nail. . . the rider is lost"—and so also for the want of a good, safe thumb tack or push pin may a painful injury be sustained or a finger or even a life be lost.

Of the numerous sorts of hazards to which one is exposed in the home, failure of a thumb tack or glass-headed push pin, though common, is perhaps among the most unlooked-for and, hence, especially to be guarded against. The consequences of an injury to the fingers when a tack is being pushed hard into a wall or board with the thumb can be painful and disabling and fraught with danger of infection, as any cut can be that goes into the deeper tissues through a small opening. Some thumb tacks of obviously inferior and dangerous—indeed one might properly say reckless—construction have appeared on the market. There are also sold glass-headed push pins capable of causing injury through unexpected shattering on being inserted. (CR has received reports of injury from failure of glass-headed push pins, caused by glass fragments' becoming imbedded in the fingers.) With a view to disclosing the dangerous types and, if possible, finding tacks and pins of superior construction that would minimize the hazard, a test of thirteen brands was undertaken. Aside from questions of danger in use, some tacks appeared to be so made as to be

subject to easy bending, or made unduly difficult to insert by an unsuitably shaped point. The tests succeeded in finding seven brands of thumb tacks of satisfactory construction, two of which were very low priced.

Several types of construction are found in thumb tacks, including the one-piece, in which head and pin are formed from the same piece of metal (as by punching out a portion of the head to form the pin, leaving a small slot in the head); the solid-top two-piece type, in which the shank is fastened by cold-swaging to a solid head, with no hole through the head; a two-piece type in which the pin passes through the head and is riveted to it, usually with a colored celluloid covering as a finish over the metal head; and a two-piece type similar in construction to the last but with a thin sheet-metal instead of a celluloid covering as a finish over the metal head. Glass push pins have sharp, tapered points, moulded directly into the glass heads which they enter for a short distance.

A test was devised in which the tacks and pins were driven into a piece of maple, a hard wood of uniform grain, by a compression testing machine. The pressure plate of the machine was covered with a piece of flexible, rubber-like material to simulate the conditions prevailing when one pushes

a tack into hard wood with the thumb. The force in pounds required to press the tacks or pins into the block of wood and their condition after being driven were noted and used as the basis for ratings. Safety, as gauged by the tack's or pin's ability to resist breaking, cracking, or crushing, was given greatest weight in the ratings. It is fair to say that the test was designed to approximate the more severe conditions under which the tacks or pins are likely to be used.

On the basis of their performance and the greater potential hazard of failure, the celluloid-covered type of tack that is constructed with a hole in the metal head, was considered generally undesirable, and no tack of this type was rated higher than *B. Intermediate*. One particular brand which was made in Japan and one American brand of this type, sold widely in five- and ten-cent stores, were found to be very dangerous to use, the pins passing through the heads quite easily. The pins of the Japanese tacks also bent much too readily. These inferior and dangerous thumb tacks, which were of the celluloid-covered hole-in-head type, sold for twice as much (5c for 50) as the best brand tested (*Rodi*, 5c for 100), which was of similar construction but with a sheet-metal covering over the head. The one-piece tack and the types of tacks whose heads (the surface pushed by the thumb) were of metal fully covering the pin were relatively safe to use. The definitely unsafe types were: (1) the celluloid covered hole-in-head type, (2) one of hole-in-the-head construction (not tested) with the head not covered in any way, and (3) glass push pins.

Glass push pins have a definite field of use, principally for hanging small pictures and other small objects on the wall—a function they usually serve better than do thumb tacks—but it was found that there was a special element of risk involved in their use. Some of the push pins tested cracked and crushed at relatively low pressures. Glass would seem to be a particularly undesirable material of which to make the head of a push pin. At best, these glass-headed pins are considered to offer a good deal of hazard, and it would be difficult to predict or even to guess how many of any given large lot of them would go to pieces under one's fingers while being applied, or how many of those cases might result in painful or disabling injury. A fair proportion came to grief in one way or another in the test, some of the heads loosening, some coming off, and others cracking or crushing. From the results of the test it appeared, moreover, that there might be greater potentiality of failure in the second or third use of a push pin, since some of the heads of those tested loosened easily after being applied once. Carefully used, however, they may be rendered fairly safe. Glass push pins should never be driven with a hammer or other hard object. They should never be applied with direct pressure of the thumb, as one uses a thumb tack, but should be grasped between thumb and forefinger, and pressure applied to the base of the head, without rocking (any rocking or side pressure is likely to loosen the pin or crack the head, and may result in a serious

cut). If insertion is at all difficult in a given case, it will be safest to apply the needed pressure on the head, with a piece of wood interposed between the glass and the fingers. In CR's tests, in spite of their sharp tapered points, the push pins all required more force to insert than the ordinary thumb tacks, although the latter showed a considerable variation in force required within the various types. Besides this, and the hazard in use, the push pins were much more expensive, and would seem generally undesirable except for uses in which the flat head of a thumb tack would be unsuitable.

In the following listings, the mean force in pounds required to seat the thumb tacks or pins is given in parentheses after the price. Tacks were nickel-plated except as noted. All ratings are cr 39.

Thumb Tacks

A. Recommended

- Rodi* (Made in Germany; sold by F. W. Woolworth Co. stores) 5c for 100. (55) $\frac{3}{8}$ -in. head. Brass-plated. Solid-top construction. Of the 13 brands tested, one of the easiest to insert. **1**
- Venus Heico* (Made in Germany; sold by W. T. Grant stores) 5c for 100. (61) $\frac{3}{8}$ -in. head. Brass-plated. Solid-top construction. A good thumb tack at a low price, only slightly harder to insert than *Rodi*. **1**
- Remco* (Robert E. Miller, Inc., N.Y.C.) 10c for 100. (73) $\frac{1}{2}$ -in. head. Solid-top construction. **2**
- Anchor*, No. C-T-17 (Maker unknown) 10c for 50. (72) $\frac{7}{16}$ -in. head. Solid-top construction. **3**
- Hampden*, No. 211 (Hampden Mfg. Co., 17 Warren St., N.Y.C.) 14c for 100. (71) $\frac{3}{8}$ -in. head. Solid-top construction. **3**
- Hampden*, No. T-2 (Hampden Mfg. Co.) 20c for 50. (58) $\frac{3}{8}$ -in. head. Steel. One-piece (pressed-out pin) construction. **3**
- Moore*, No. 52 (Moore Push-Pin Co., Philadelphia) 15c for 100. (75) $\frac{7}{16}$ -in. head. Solid-top construction. **3**

B. Intermediate

- Draftsman* (Made in Austria; sold by S. S. Kresge Co. stores) 5c for 50. (42) $\frac{3}{8}$ -in. head. Relatively unsafe celluloid-covered hole-in-head construction, but tacks tested performed without failures; found to be one of the easiest to seat of all the thumb tacks tested. **2**

C. Not Recommended

- Bear* (Made in Japan; sold by W. T. Grant Co. stores) 5c for 50. (61) $\frac{3}{8}$ -in. head. Hole-in-head construction; celluloid covered. Notwithstanding claim "Pin will not pass through the head," pins did in fact pass through heads in the astonishing proportion of 4 out of 5 of the tacks tested; moreover, 3 of the 5 tacks bent while being applied. **2**
- Thumb tacks made by Holland Mfg. Co., Baltimore; sold by F. W. Woolworth Co. stores. 5c for 50. (41) $\frac{3}{8}$ -in. head. Hole-in-head construction; celluloid covered. One of the easiest to seat of all the thumb tacks tested, but pin passed through head in 3 out of 5 samples tested. **2**

Push Pins**B. Intermediate**

Temper-Ex Crystal (Stransky Products Corp., 261-267 Canal St., N.Y.C.; sold by F. W. Woolworth Co. and S. S. Kresge Co. stores) 5c for 4. (111) Well made, though required by far the greatest pressure to insert of all push pins and thumb tacks tested. 3

Heads of several of the following pins tested, cracked, chipped, or loosened.

C. Not Recommended

Moore, No. 1 (Moore Push-Pin Co.) 10c for 6. (89) 3
Moore, No. 2 (Moore Push-Pin Co.) 10c for 6. (96) 3

Important New Health Hazard to School Children

ABOUT a year ago educators began to advocate, in the interests of better visibility, the substitution of yellow crayon for white, for school blackboard use. The professors were possibly quite right in their belief that yellow writing would be more easily read than white, but neglected, as innovators often do, to take account of the fact that the manufacturer was very likely to produce yellow, green, and buff shades by mixing a lead compound, such as lead chromate, with the white chalk.

Yellow crayon in place of white has been used in many schools for several months, and already in Wisconsin, an outbreak of lead poisoning (always difficult—and slow—to diagnose) has been found among school children. When the air in the classrooms was tested for lead, the contamination was found to be several times greater than that which would be tolerated by public health authorities in factories doing processing of lead pigments, glazes, and similar materials. Use of yellow chalk in schoolrooms was, therefore, banned in the city of Milwaukee, and it is hoped that it will be promptly abandoned in other cities where this information comes to the attention of teachers and school executives.

Lead poisoning from lead-containing dusts causes a serious and insidious and possibly permanent impairment of health. The hazard is particularly great in the schoolroom because of the constant use of chalk, which gets on hands and into mouths, and the extreme energy with which little boys clean the blackboard and chalk erasers. Moreover, since children are especially susceptible to lead poisoning, parents will do well to inquire of their children whether yellow, orange, buff, green, or yellow-green chalk is used in school (or college) and insist that use of such chalks be abandoned until reliable assurance can be given that no pigment having its source in a toxic metal has been used for coloring. (Lead pigment would be most common in such use because of its cheapness.)

CR's readers will be interested in this case because of its indication of the risk of making even simple changes in conventional practices when a complex industrial technology is involved. In so complex a structure of technical production, there

are many cases wherein a reasonable conservatism is the best safeguard of the consumer's health and welfare.

The consumer, as will appear from this and many other instances CR has called to attention, simply cannot rely upon the interest and alertness of the manufacturer, however large or important, to safeguard against such faults and mistakes of production as the poisonous chalk implies. The maker sees his job as essentially that of producing the goods ordered and, for the most part, he accepts that commission on terms which minimize production costs. He will not, therefore, normally concern himself with possible errors or contaminations except as they may interfere with salability. The consumer must now, and for perhaps many decades to come, provide his own checks and balances against errors occurring in this way. Where school affairs are concerned, the school officials must be at pains to do this because the parent is himself not normally in direct relationship to such a problem.

CR ventures the suggestion that if there were more teachers of chemistry who took an interest in the more important aspects of chemistry which have to do with the toxic effects of commercial products, it would have been very unlikely that a situation of this kind could have spread far or continued long. It is to be hoped that high school teachers of the sciences will give attention to the numerous instances which CR has discussed, where unexpected hazards of poisoning arise in industrial processing of foods and other consumer goods (lead and arsenic sprays and dusts on fruit and other farm produce, and numerous sorts of toxic hair dyes are cases in point).

CR recently checked on two well-known brands of yellow crayons used in the school system of a nearby city to see if lead was a factor, and obtained the following results. Ratings are CR 39.

C. Not Recommended

An-du-septic Sight Saver (Binney & Smith Co.) Lead content very high, about 6%.

Hygieia Forsyte Dustless Crayons (The American Crayon Co.) Lead content, about one percent; though much less than for *An-du-septic*, would undoubtedly be dangerous for schoolroom use.

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